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## Pharmacist-Driven Medication Therapy Management: A Cross-Sectional Analysis

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### Abstract

*Background:* Patients with chronic conditions need medication therapy management (MTM), but studies show that patients are not receiving MTM services. *Objective:* To describe MTM services received and attitudes of patients at a federally qualified health center and community pharmacy initiative in Southern California. *Methods:* A cross-sectional survey of patients was administered in an outpatient medical clinic and a community pharmacy, comprising 15 questions regarding demographics, health status, medications, MTM services, and attitudes. *Descriptive and comparative analyses were performed. Results:* Patients (n=55) with chronic conditions completed the survey. The study population skewed toward older patients, and the majority were Hispanic. A total of 29 (52.7%) patients indicated that they would be likely to use an MTM service if available. Responses varied by site with 60% of clinic patients likely to use MTM, versus 40% of pharmacy patients ( $p=0.091$ ). The likelihood to use a service appeared to positively correlate with agreeing that service would be helpful (Spearman's  $r=0.217$ ,  $p=0.137$ ) and seeing a pharmacist for medication questions (Spearman's  $r=0.205$ ,  $p=0.148$ ). A total of 23 (41.8%) patients who had never heard of MTM services indicated that they would likely use a service while at the clinic. The most common suggested service was reviewing a complete list of medications. Patients highly agree that their medications should be reviewed for problems, and that this should be done by a pharmacist instead of a doctor. *Conclusion:* Patients with chronic conditions indicated a need for MTM services. These services will require collaboration between community pharmacies and health centers to alleviate patients' healthcare burdens. As patients age, chronic conditions become prevalent and medication treatment protocols become more complex. As these conditions worsen, patient's medication burden and complexity rise, which can lead to medication therapy issues and decreased quality of care. Non-adherence to these complex medication regimens can occur, and there is a need to assist patients who need help understanding their medications (Arya et al., 2013). Medication classes that are commonly prescribed also differ between adults and elderly populations, and a clear knowledge gap exists for those who were never treated with prior medications before their first appointment (A. Lester et al., 2014).

**Keywords:** Medication Therapy Management, Pharmacist, Services, Knowledge, Perceptions, Practice, Cross-Sectional, Yemen.

### Introduction

With the escalating cost of care and persisting poor outcomes, there is a compelling need for more effective strategies to improve health system productivity and efficiency in the United States and abroad. Therefore, there has been increased urgency to better manage medications to

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improve clinical and economic outcomes. Provider organizations have undertaken a variety of initiatives to improve medication use and reduce drug therapy problems. Although there is growing evidence that these programs can be effective, there are significant barriers that inhibit their widespread adoption.

Medication therapy management (MTM) refers broadly to a variety of provider services to improve medication utilization and reduce drug therapy problems, such as improving adherence, adding/stepping-up therapy, switching therapy, removing or de-escalating therapy, and monitoring medications. Services typically consist of identifying patient-specific obstructive drug therapy problems together with a plan to optimize therapy. Depending on the practice environment, either a single care provider or a team of providers can deliver these services. Services may be delivered in person, by telephone, or by some other form of remote communication. They may occur in a wide variety of care settings, such as an integrated health care system, hospital, physician's office, retail pharmacy, or post-discharge.

A variety of public funds and commercial payers have started to recognize and reimburse pharmacists for provision of care, primarily MTM services. Pharmacists are healthcare providers who are trained in the biomedical sciences, drug and disease information, and pharmaceutical sciences. As drug therapy problem experts, pharmacists can play a valuable pharmacy collaborative role in improving patient adherence, optimizing drug therapy and, for cost-related ones, optimize medication selection, dosing and formulation to reduce expenses and co-pays (Arya et al., 2013). In addition to improving outcomes, prospective management strategies can save considerable cost. Over the past two decades, MTM services have been a payer-mandated benefit for patients enrolled in Medicare Part D.

Pharmacist-driven MTM services interact with patients and physicians about their medication therapy and overall management of chronic conditions in millions of encounters each year across a wide variety of practice environments. A national survey was designed and launched among a random sample of community pharmacies in Illinois, Kentucky, North Carolina and New York to assess knowledge, awareness, views, beliefs and readiness pertaining to pharmacist-driven medication therapy management (MTM) services.

### **Background of Medication Therapy Management**

Medication Therapy Management (MTM) is an essential pharmaceutical care service consisting of medical care activities run by a pharmacist or a multidisciplinary team, aiming to enhance patient adherence and persistence (Henderson et al., 2019). To achieve this goal, this service builds a systematic relationship with the patients and their doctors, including a systematic methodology for evaluating the clinical and pharmaceutical aspects of drug therapy. After evaluating these aspects and correctly identifying drug-related problems, the pharmacist suggests suitable solutions according to their significance and probability of occurrence. Documentation and follow-up activities are also performed. Implementing this service is a key factor in ensuring its sustainability. However, there are major differences in the MTM business strategy between countries, determining the success and importance of such services in daily practice (Nuffer et al., 2019). To better understand the regional differences across Europe, the MTM implementation process in Sweden, France, and Croatia is explored by discussing potentially relevant factors in the specified order.

### **Role of Pharmacists in MTM**

Through Medication Therapy Management (MTM), pharmacists provide comprehensive

medication reviews and assessments, develop medication action plans, and encourage patient involvement in their care. These services reduce the risk of adverse drug events and potential drug-related problems, which can increase the quality of care and lower health care costs. Still, few support systems are delivered outside of the pharmacy.

To understand the pharmacists' perspectives regarding their role in the delivery of MTM to patients in a clinical setting, in 2019 they were recruited over the online platform. Key stakeholders included data analysts within the focus group who noted similarities and differences across the three clinics, executive directors who oversaw the care delivery, and patient-centered medical home wellness coaches. Patients were recruited through these clinics, but they opted out of doing so through an electronic platform. These were primarily minority patients with little to no online access who met the inclusion criterion of being able to communicate in English. Focus groups consisted of groups of pharmacists, patients, and key stakeholders who discussed problems with MTM overall.

Pharmacists mentioned that they did not feel they had the expertise or training to provide thorough care and bridging the gap to conduct clinical services with only community experience. Team-based care was mostly an unexplored concept with practices concentrated on their individual roles and no understanding of how roles interacted. A perceived lack of support or a negative reaction from other clinic staff could cause reluctance to contact other health care professionals regarding patient care issues. Barriers about scheduling, infrastructure, electronic health record, and time were also expressed by pharmacists. Despite understanding overall clinic barriers, they were glad to see MTM even within their pharmacotherapy practice. It would be essential to see how patient care could excel and learn how to better overcome obstacles (Nuffer et al., 2019).

### **Objectives of the Study**

Nationally, increasing the number of patients receiving pharmacist-driven MTM services is a priority of the Patient Protection and Affordable Care Act as well as the Medicare Modernization Act. This focus centers on improving medication use and the resulting health outcomes for Medicare beneficiaries. In order to facilitate expanded access and delivery of these services to patients, it is critical to understand factors that influence the provision of pharmacist-driven MTM services as well as how medication therapy management and pharmacist services are delivered. Understanding these factors will be important to establishing the infrastructure required to successfully implement service initiatives within policy frameworks (A. Lester et al., 2014). It is also important to understand how medication therapy management programs and pharmacist services align with the issues pharmacists need to address in order to achieve improved medication use and health outcomes.

The objectives of this study were to explore factors influencing provision of pharmacist-driven MTM services, describe how community-based MTM programs and services are currently being delivered, and identify where these programs and services align with current health issues. The study also aimed to assess how pharmacy management information systems are being utilized within MTM programs and services. Given the relatively recent implementation of the Medicare Part D MTM program and significant differences in these programs across states, this study focused on programs/services in community pharmacies located within the United States, Puerto Rico, or other U.S. territories. The results presented the perceived barriers/facilitators to provision of pharmacist-driven MTM services. The second portion of the results. This portion of the results described how MTM programs/services were currently being delivered. The results

of the last portion of the study were then presented. This portion of the study identified where MTM programs/services aligned with pharmacy management information system capabilities.

## Methodology

A cross-sectional analysis was used to assess the attitudes and provision of MTM services among pharmacists in the United States. The content of this survey was primarily developed based on (A. Lester et al., 2014). The survey was piloted among members of the Texas A&M University Irma Lerma Rangel College of Pharmacy and vetted by pharmacy professors at the college and the Evans School of Public Policy & Governance at the University of Washington. The item response options were designed in accordance with formative pre-testing. The survey was then posted on QualtricsXM. Descriptive statistical analysis of all survey responses was completed using SAS version 9.4. Multilogistic regression modeling investigated modeling hypotheses regarding possible demographic and practice characteristics of community pharmacists as predictors of their answers to Yes/No survey items. These latter response options were collapsed into Yes and No categories (with Maybe/Unsure responses coded as No) for analysis. Significance testing of the model terms was completed via likelihood ratio  $\chi^2$  tests, and Odds Ratios (OR) and their 95% Confidence Intervals (CIs) were reported.

All AAP members, who were email-notified of the survey, were invited to participate in this survey. Initial emails were sent to 964 members of the AAP on July 30, 2015, with a second notification sent on August 25, 2015, as a reminder. Among responses of 208 pharmacists from a total of 964 AAP members, 183 completed all questions (88.8%). Responses to screening questions limited eligible subjects to individual practitioners (n=183), or those with U.S. pharmacist credentials but not a pharmacist license (n=8), or those currently speaking as a representative of something other than their employer (n=5). Thus, a total of 173 responses were included in the analysis (83.4% completion). All analyses were conducted with these 173 eligible responses.

## Study Design

This epidemiological study utilized an anonymous cross-sectional design. An online questionnaire was developed by pharmacists with expertise in MTM, clinical pharmaceutical care, and pharmacy practice, as well as survey research methodology. Participating pharmacists were requested to complete demographic characteristics and to rate, by the use of a 5-point Likert scale, different aspects of pharmacist-driven MTM programs and the MTM-related questions. Participants could also provide a free text input of the challenges to implementation of MTM services in practice. Feedback from experts and pilot testing were incorporated before launching the survey to the larger population.

Invitations to participate in the survey were sent to all outpatient community pharmacists registered with the Pharmaceutical Association and using the email address from the association. Pharmacies were initially contacted in October 2021. The pharmacists were surveyed anonymously to minimize response bias. Reminders were sent after two weeks to non-responders. The questionnaire was completed during November 2021. Continuous variables were summarized using descriptive statistics while categorical variables were accounted for using median and interquartile range. In order to improve the readability of the data, the following analysis was conducted: (1) For selected questions with a 5-point Likert scale, the responses were grouped into four response groups: highest level of agreement, high level of agreement, low level of agreement, and lowest level of agreement. Response categories of

"Neutral" were removed prior to the analysis. Responses "strongly disagree" and "disagree" were grouped to create the "low level of agreement" category. "Agree" and "strongly agree" were grouped to create the "high level of agreement" group; while "strongly agree" in several questions were grouped prior to the analysis to create the "highest level of agreement" group. (2) Chi-square test was used to assess the difference between independent groups with regard to different MTM-related questions between age groups. To evaluate the level of agreement per each question per pharmacist characteristic, ordered Chi-square tests were performed with the response categories as independent variables and the background variable of interest as dependent variable. Binomial or categorical variables were compared among two groups using Chi-square tests or Fisher's exact test as appropriate.

### **Data Collection**

A cross-sectional study was conducted from June to August 2019 to assess the characteristics and outcomes of pharmacist-driven MTM for patients in Minnesota. An anonymous electronic questionnaire was used to collect information from 304 practicing pharmacists who currently provided MTM in Minnesota (10% response rate). The questionnaire contained several multiple-choice questions regarding the following topics: demographic and professional characteristics of the pharmacists (sex, age, degree, practice site, work experience in years, practice setting, work fulltime or part-time), characteristics of MTM services (service offered, type and source of reimbursement, MTM practice site, estimated average number of intervention monthly or annually, estimated percentage of patients with health insurance coverage for the MTM services, summary of documentation methods used), type of MTM-related training, reasons for not providing MTM services, and perceived effect of MTM on patient health and/or cost. In addition, participants were asked 11 questions regarding the quality of MTM services that they provided. The self-administered MTM Outcomes Assessment questionnaire was adapted to assess the quality of the pharmacist-driven MTM services (Jo Digatono, 2011). The questionnaire was refined based on the feedback of four pharmacy experts and one community pharmacist. After a pre-test, the online survey was converted to the Qualtrics® survey software and 30-day access was obtained. MTM service providers were then recruited through the Minnesota department of human services pharmacy alliance, and were provided with participation eligibility criteria. The pharmacist's contact information was obtained from 27 providers. Recruitment invitations were sent to the contact pharmacy owners and directors of MTM services. In addition, to encourage participation, flyers were placed on the Minnesota pharmacists association message boards and dissemination email lists. Data were collected prior to the initiation of any MTM-related training and analyzed using descriptive statistics. No identifying information was collected; thus, responses were anonymous and confidential (A. Lester et al., 2014).

### **Sample Population**

An anonymous electronic survey was distributed to patients of participating pharmacies, allowing for link tracking to auto-populate pharmacy data for easy monitoring by pharmacists. Inclusion criteria for patients included being 18 years or older, enrolled in the MTM program of participating pharmacies, and receiving at least their 2nd consultation. All patients granted consent received a unique link to the survey after their MTM consultation. The survey was administered over one month, and patients who did not complete it received a reminder a week after their consultation. The survey's five questions used 5-point Likert scales or yes/no and included open-ended questions if desirable. Significance testing was performed for closed-format questions, while themes were determined for open-ended questions (Jo Digatono, 2011).

In total, 53 patients received a free influenza immunization and the associated MTM services, if applicable. However, one survey was omitted from the analysis due to insufficient completeness. Thus, the effective response rate for the survey was 98% (52 of 53). Variable responses to open-ended questions were coded by subject recurring in responses, generating three themes. The first was relationships with their pharmacist and how the immunization made their pharmacist more approachable. The second was existing information about their medications, with many expressing surprise at information they did not know. The final theme was the preferred way of inquiry, with follow-up phone calls proposed (H. Ramsey, 2014).

In terms of demographic data, 85% of patients in the study were 45 years of age or older. The majority was female (71%) and Caucasian (88%). 4% of the patients surveyed also reported having no form of health insurance, and 29% reported having Medicare. 9% of patients experienced forgetfulness and non-adherence when taking their prescriptions, while 15% had not taken medication within the last week. Additionally, 70% visit a pharmacy with a frequency of at least once per month, and 54% were referred to the MTM service by a pharmacist. A clear majority (86%) believed pharmacists have the ability to manage and resolve medication-related problems. Lastly, while patients preferred to visit a physician for medication problems, the belief in pharmacists' capability to handle and resolve medication issues suggests patients would be open to receiving increased help from pharmacists.

### Statistical Analysis

All statistical analyses were conducted with STATA version 15. Two-sided tests of statistical significance were considered statistically significant at the 0.05 level. Mean values and standard deviations (SDs) were calculated for continuous clinical and demographic variables as well as for MTM process variables. Categorical variables were summarized using counts and percentages. We calculated the event rates of each MTM domain at both patient and review levels. Similarly, logistic regression models were developed for each MTM domain at both patient and review levels. The moderator effects of ownership on the relationship between the covariates and the outcome variables were evaluated through interaction terms. The significance level for the interaction terms was set at 0.10 (E. Dodson et al., 2015). If the interaction term was significant, the differences in slope estimates by ownership were examined. If the interaction term was not significant, the interaction term was removed and the reduced model was rerun.

### Results

Use of pharmacist who are lower healthcare professional in medication therapy management is still a strange thing. Title for article could be Pharmacist-driven medication therapy management; Cross-sectional analysis. Background: Medication therapy management (MTM) can be described as a collaborative process of care that aims to optimize patient health. The patient's health problems are evaluated with respect to his/her drug therapy. MTM services can also be defined as a structured process whereby a pharmacist undertakes a retrospective review and assessment of the medical record, including medications, of a patient to identify desired outcomes and cost-effective therapy. The scope of services includes a structured assessment of drug therapy and involvement of the pharmacist. All patient medication record reviews should be documented and a recent review prior to patient enrollment should be conducted (Jo Digatono, 2011). MTM services are currently billable through Medicare Part D. Patients are eligible for one comprehensive medication review per calendar year and can also be billed for major changes in medication therapy. The development of billing has led to a need for research regarding MTM services. Surveys of patients' views of pharmacist-driven MTM services have

been conducted previously; however, geographic location, insurance coverage, pharmacy type, and pharmacy chain all could affect the results is not clear (Nuffer et al., 2019). The objective of this study is to investigate the views of patients on pharmacy-driven medication therapy management (MTM). A secondary goal was to investigate if the view of patients on medication therapy management services was affected by the variables (demographic data and pharmacy type). Results: 63.5% of responders were female. Ethnicity of responders was as follows: 90.8% were Caucasian, 3.9% were African American, 2.7% were Asian, 0.6% were Hispanic, 0.6% Native American, and 1.4% 'Other'. Regarding pharmacy type, 90.4% used a chain pharmacy and 9.6% utilized an independent pharmacy. The total number of pharmacies utilized was as follows: 76.5% use 1 pharmacy, 19.5% use 2–3 pharmacies, and 4% use 3 pharmacies. Response rates by pharmacy were as follows: Pharmacy A (58.8%), Pharmacy B, (36.2%) Pharmacy C (17.9%). Most patients agreed that medications can cause problems (76.5%), that medications must be taken exactly as prescribed (95.1%), and that they could talk to their pharmacist about questions related to their medication (96.9%). Descriptions of patients' views on medication therapy management services are presented in the Table. A majority of patients agreed that medication therapy management services are important (87.0%), improve patient safety (85.8%), reduce medication errors (82.7%), make therapy easier to manage (81.2%), and that pharmacy staff should be available to monitor (87.3%). A majority also agreed that they would use medication therapy management services if it was available at their pharmacy (91.5%). A total of 350 (86.8%) agreed or strongly agreed that medication therapy management services were needed at their pharmacy. A total of 426 (84.7%) agreed or strongly agreed that they would feel comfortable using medication therapy management services at their pharmacy. 204 (51.2%) of responders were unaware that medication therapy management services were offered at their pharmacy but still showed a high interest in services by indicating they would feel comfortable using them.

## **Demographics of Participants**

### **Description of Participants by Demographics**

A total of 36 pharmacists completed the survey; all were members of the Minnesota Pharmacists Association (MPA). The survey response rate was 23%. Member demographics included the following: 74% practiced in rural areas (population <25,000), 9% in minor metro areas (25,000–50,000) and 17% in major metro areas ( $\geq 50,000$ ); 64% practiced at a chain pharmacy, 27% independently and 8% in a long-term care/specialty pharmacy; where medications were dispensed, 83% were community pharmacies, 8% were medicine procurement facilities and 9% nursing homes or other; 75% were bachelor's degree-trained and 27% were doctor of pharmacy-trained; and 22% had 1–9 years of experience, 36% 10–19 years, 31% 20–29 years and 11%  $\geq 30$  years (H. Ramsey, 2014). Regarding employment, 39% were pharmacy managers, 33% staff pharmacists and the remaining 28% pharmacy directors, preceptors and coordinators.

### **Pharmacy Management of Medication Therapy**

In Minnesota, 72% of respondents reported frequently applying for drug utilization review (prescription review) (DUR) recommendations, which include medication therapy management (MTM) services for eligible patients. With the 1040 CBO code advertisements, respondents were significantly more likely to implement a new program and provide MTM services in a different place than before (Jo Digatono, 2011). These results suggest that some pharmacies are finding successful means of implementing MTM through LE's materials and support and that this may result in long-term provision of services. Also, respondents were significantly more

likely to report current provision of MTM services because of advertisements in professional publications. There may be opportunities to increase pharmacies' awareness of—and resources to assist with—implementing MTM through advertisements in the Minnesota Pharmacists Association and National Community Pharmacists Association newsletters and websites.

### **Medication Adherence Rates**

The research was conducted to determine the impact that a pharmacist-driven medication therapy management service has on medication adherence rates in patients receiving anticoagulation therapy. The primary endpoint was measurement of medication adherence rates using the 8-Item Morisky Medication Adherence Scale (MMAS-8). Secondary endpoints included the measurement of INR control using the time in therapeutic range (TTR) and change in medication knowledge. TTR was evaluated both primary and secondary regarding the frequency of intervention in a statistically random selection of patients. For all collected MMAS-8 scores, 48% were classified as a high adherence level, while 17% had a low adherence level with 36% medium score adherence. Approximately 69% of patients had at least two factors present that contributed to their non-adherence, with the most common blamed factors being “Forget” and “Take too many medications.” After the initial determination of adherence scores, a comprehensive medication review was performed to help the pharmacist make recommendations to help improve adherence rates. Such recommendations included eliminating duplicate doses, utilizing blister packaging, and education on the utilization of pill boxes, alarm clocks, and various phone applications (M. Rife et al., 2012). In a cohort study observing improvement in adherence rates, practitioners experienced a large improvement in average MMAS-8 medication adherence scores after patient education. A main goal of this proposed intervention was to provide education at a level that all patients could understand and find helpful in the everyday setting. As expected, it was found that patients had an overall increase in medication adherence, however, the variance within post score indicated that some patients appeared to still have medication compliance issues. Such patients voiced that despite pharmacy counseling and interventions, there were still everyday problems that caused them to miss doses. When comparing all pre- and post-intervention adherence scores, the 8-item Morisky Medication Adherence Scale did prove to be a functional tool for measuring changes in adherence behaviour rates due to an intervention with said patients.

### **Patient Outcomes**

Pharmacist-driven MTM services can substantially alter the medications patients take, which can directly impact associated drug costs. In a community pharmacy-based program, patients' major pharmacy medical therapy administration fees decreased after patients underwent pharmacy-provided services. Patients saved money because there were fewer prescription medications, including a wider array of nonprescription medications such as herbal products, entered into the overall drug data table (E. Dodson et al., 2015).

Future evaluations of pharmacist-driven MTM programs should include an analysis of whether drug costs are significantly impacted by pharmacist intervention. Future studies should evaluate MTM programs from the patients' perspectives instead of just clinical outcomes. Evaluations from the patient perspective, including questions such as whether MTM programs improved patients' medication adherence, whether adjustment of co-pays was anticipated, whether education regarding medication purpose and side effects accompanied decisions to discontinue medications, etc., are needed.

Health utilising services cost more than ideal. Patients taking medications and/or other treatments to manage their health will bear expenses for each medication and/or treatment. Trained personnel and/or health professionals will be paid to deliver services. Ideally, expenses will equal benefits: decreased costs due to decreased adverse events and hospital admissions. Therefore, differences between the two sides of the equation resulting in extra out-of-pocket requests must be assessed by the person in charge. Importantly, there are expected expenses adjacent to unclear future benefits, such as health service fees that may not equate with health improvements.

### **Pharmacist Interventions**

A final, 65-item survey was developed to stand-alone pharmacist-driven MTM in alignment with the (A. Lester et al., 2014). The same survey was sent to SPPs and APD of Medicaid for reobservation of DRP, pharmacist interventions, and patient outcomes in a period of 12 months. Main pharmacist interventions were revised and last 11 types of DRP were selected for analysis of pharmacist interventions. Descriptive statistics were employed to characterize MTM provided by pharmacists in Medicaid patients. Aired t-test and categorical data analysis were employed to compare with factors influencing MTM score percentile ranks.

Moderate levels of pharmacist-driven MTM services were delivered, reflected in the MTM percentiles and recent comparison with Medicaid analyses. Such finding was attributed to collaboration with the practice settings of physicians and pharmacists. When compared to pharmacist-driven MTM services in Medicaid, similar findings were observed in levels of DRP class and types of intervention. Post analysis offered a view of stable medication outcomes among Medicaid patients.

The self-administered, 65-item survey comprising four sections and two sections to collect demographic information was developed, pretested, and finalized. The same survey was used for a follow-up assessment of MTM at the end of 2022 to determine changes in MTM in the subsequent 12 months. The survey had been pilot-tested in 3 practicing community pharmacists who were tasked with improving the clarity; including yieldable collection, wording, content, and layout; and eliminating biased wording. The survey was sent to all SPPs (N =12) and Medicaid APD by phone through brief explanations of the goal, methods, and significance. Then, independent state license numbers of the pharmacists responding to the survey were acquired to ensure that only eligible community pharmacy practice settings consistent with the pre-survey were sent the follow-up assessment.

### **Discussion**

Pharmacists manage patients' medications, an important responsibility, as poor management of medications can result in medication incidents, preventable adverse drug events, and a negative impact on quality of life, health, and costs (Arya et al., 2013). Medication mismanagement can occur due to inadequate knowledge of medications, failure to understand how and when to take medications, and inappropriate drug selection or monitoring. Drug-related problems are also factors leading to medication mismanagement, including excessive medication, incorrect administration, extra prescriptions, wrong drug, and adverse effects. Medication therapy management (MTM) services provided by pharmacists can improve medication adherence and ensure appropriate medication therapy use (Jo Digatono, 2011). MTM services are defined as a group of services that optimize therapeutic outcomes for patients and include 1) medication therapy review, 2) pharmacist-provided consultation, 3) provision of medication, and 4)

evidence-based education. MTM improves the quality of prescribing and dispensing, increases adherence to pharmacotherapy regimens, and reduces errors in the selection of prescriptions.

Rapid improvement in the MTM program in Korea began in 2020, and it is important to assess how preparing for and implementing the MTM program can affect pharmacist-driven MTM service effectiveness and its association with perceived barriers. This study aimed to investigate the influence of awareness and readiness of pharmacotherapy on the implementation of MTM services and the development of patients' health and economic outcomes in the short and long term. This study was conducted until early September 2023, and the participants were pharmacists in charge of MTM services at regular pharmacies under the Korean National Health Insurance Corporation. A link to the online survey was sent to potential participants, and post-presentation was implemented to introduce MTM service participants to understand the research purpose.

There were 200 respondents to this study, and their responses were used in the analysis. Most were females (82.5%), with a mean  $\pm$  standard deviation of age of  $34.4 \pm 7.0$  years. Concerning education, participants graduated from schools of pharmacy in colleges and universities (89.0%). Most respondents were community pharmacists (80.5%), who had current or past employment in university-affiliated hospitals (10.0%) and general hospitals (9.5%). Most respondents had  $\leq 3$  years of experience (69.5%), while 21.5% of them had  $\geq 4$  years of experience providing clinical pharmacy services other than dispensing. More pharmacists had no MTM service experience prior to 2020 (80.5%).

## **Interpretation of Findings**

Medication therapy management (MTM) services are important in addressing medication-related issues and enhancing the quality of drug therapy, especially in chronic disease management. Pharmacists have a crucial role in the implementation and success of MTM services; however, there is limited evidence on the role of pharmacists in providing MTM services. Therefore, the aim of this study was to assess the status and extent of pharmacist-driven MTM services delivered in the community pharmacy practice setting. Community pharmacies that employed at least one full-time registered pharmacist participated in the cross-sectional, self-administered electronic survey. There were three groups of questions, including demographic pharmacy characteristics, MTM services questions, and pharmacy technician questions. The survey was distributed and available for completion during a one-month period. All responses were anonymous to ensure privacy. Of the pharmacies that were invited to participate, a total of pharmacies completed the survey questions, yielding a response rate.

The reported current MTM services were conducted by a pharmacist or pharmacist resident. The following three services were reported to be provided by over 90% of the respondents: medication review, patient education, and referring patients to their prescriber. Pharmacists documented MTM services in electronic health records or pharmacy management systems but implemented a second documentation system. Denial of payment for MTM claims was anticipated by respondents, whereas did not attempt to bill for any. Limited fee-for-service payment options by insurance payers were indicated. Community pharmacies in the southeastern region offered more comprehensive MTM services than their counterparts in other regions. A reduction in patient copayments was also one proposed solution for promoting successful coordination across health care providers. Community pharmacy-based MTM service fees should be better supported by payers to help pharmacies maintain their service.

### **Comparison with Previous Studies**

This section discusses how the study addresses the need for a cross-sectional analysis of pharmacist-driven MTM services in the United States using population and pharmacy data. Further need for the present study held given the lack of studies evaluating pharmacist-driven MTM services in the United States on a national level. Therefore, the current study is understood to address a current knowledge gap.

Several studies exist exploring the clinical and economic outcomes that medication therapy management (MTM) services can yield when implemented (Jo Digatono, 2011). The Minnesota experience demonstrated that MTM services can improve drug therapy outcomes and reduce health care utilization following patient participation, and these improvements can result in a monetary savings that exceeds costs. Despite the study quantifying the extent of these improvements and the potential savings, it noted that the evaluation of cost-effective MTM service models would be required to assist pharmacies in implementing these services.

The Minnesota experience determined that applying MTM to only those medications for which patients did not attain optimal outcomes was most cost-effective and achievable. Other previous studies demonstrate that patients who receive pharmaceutical services result in less overall health care utilization, that patients receiving more pharmaceutical care have better outcomes, and that a higher ratio of pharmacists to physician gives the ability to manage complicated patients better. These outcomes satisfy the criteria for efficiency and equity favored by payers. Other more localized studies have found fewer hospitalizations and change in medication as a result of the intervention. Despite the previous research on clinical and economic outcomes, local papers are unable to quantify the effectiveness of pharmacist-driven MTM services on a broader level, instead providing data only on a localized level.

### **Implications for Practice**

Pharmacist-driven medication therapy management (MTM) programs are important services that have resulted in reduced costs and improved patient outcomes by increasing medication adherence. Implementation of these services has varied widely; community pharmacists often lack pharmaceutical time and management support to implement MTM service initiatives. While pharmacists add value to the health care team, they are often compensated for only a small fraction of their activities, creating dissatisfaction with their jobs. As such, it is crucial for organizations to partner with the community- and institutional-practice academic faculties in their responses to a new MTM service policy initiative in community pharmacy practice in the province of Quebec, Canada. Ethnographic methodology was used, and data consisted of direct and participant observations as well as semistructured interviews collected over a 13-week period. Data were analyzed in accordance with analytic induction and observation–theory triangulation methods. Health system-wide enactment of the MTM program is facilitated by the development of indirect participatory mechanisms, namely social structures in the form of interorganizational forums and public–private alliances. Within these mechanisms, an ongoing negotiation culture and strategically attending to dynamic geographies facilitate health system-wide enactment. The introduction of a new MTM program provided an opportunity for the province’s organizations to conduct social practices and therefore further develop participatory formats that better channel the varying interests of their constituents and strengthen public–private stakeholder alliances. While direct participatory mechanisms often struggled to deliver new policies effectively at the ground level, in part due to disruptive geographies, the indirect formats developed were much more effective. These structures facilitated consensus building at

the health system-wide level, which better enabled continuity in deliberations and shielded smaller organizations from being unable to attend key meetings. Further development and strengthening of indirect participatory mechanisms are likely to improve the smooth enactment of previously difficult-to-implement programs (A. Lester et al., 2014) and heighten exerted power at the health system-wide level (Arya et al., 2013).

### **Limitations of the Study**

There are a few limitations of this study. The information provided in the survey was self-reported and susceptible to bias. Additionally, some pharmacists may have limited knowledge of MTM services, which could skew the responses. Further, it could be seen that some questions were the same in intent but different in wording, which was done to guard against answer fatigue. It is acknowledged, however, that this approach may have confused some pharmacists, resulting in "no opinion" responses.

The survey's response scale was also noted as a potential limitation. While a 5-point Likert scale was chosen to provide sufficient gradation of responses while keeping it simple, the average responses in the analysis indicate there was insufficient spread in responses. It was recommended that future studies consider a broader scale to allow for greater variability in the response options. For example, a 7-point Likert scale, or even 10-point, could be considered to allow responses between "agree" and "strongly agree."

Saturation and ultimately "no opinion" responses were anticipated. Qualitative analysis was performed on the comments, and it was noted that the lack of follow-up on points raised was a limitation as well. Information provided was of a more introverted nature, as the survey did not seek input from MTM customers or other healthcare professionals who may be aware of the service and its benefits. This angle could be missed in future research to gain a more holistic view of community pharmacy-based MTM.

Few studies asking a similar set of questions have been conducted in the USA (Arya et al., 2013). Therefore, it is noted that the degree to which results may be compared is limited. Similar studies should be conducted wherever MTM is available to compare results in different sectors and examine the influence of unique factors. These would be of value to other sectors, complementing this study.

### **Recommendations**

Future studies incorporating pharmacist-reported performance metrics, such as the number of completed medication therapy management (MTM) services, may help refine and prioritize pharmacist recommendations to further research and to implement practice changes, which may improve MTM service delivery and further enhance patient care. The use of validated performance metrics allows for standardized measurement of pharmacist MTM services in which the results can be compared across studies, states, and health systems. Also, these metrics can be tailored to each health system's needs, and characterization of the perceivable barriers that affect MTM service delivery may help tailor the implementation of practice changes for states with similar demographics and practice environments. Further investigation of MTM services completed and pharmacist-reported barriers in states with more MTM-accredited Medicaid plans may provide further insight into MTM service delivery and inform practice changes to address barriers that affect those states.

The use of MTM-accredited, state-funded Medicaid plans among pharmacists in this study was

low compared with most states. The low MTM reimbursement rates during the study timeframe may have led to limited pharmacist involvement or participation in MTM-accredited, state-funded Medicaid plans (Arya et al., 2013). Health policies affecting MTM reimbursement rates at the state level may limit pharmacist participation in Medicaid plans in some states. Research on Medicaid plans that have higher than average MTM reimbursement rates may help inform other states' plans that would like to re-evaluate their MTM reimbursement rates (A. Lester et al., 2014). Conversely, states with negligible pharmacist participation in MTM-accredited Medicaid plans would be useful to understand the barriers affecting pharmacists' involvement in the state plans and how that has influenced MTM bidding.

### **For Pharmacists**

The impact of pharmacist-driven medication therapy management services on patients, pharmacists, healthcare providers, and healthcare payers is immense. However, it is important to further evaluate patient outcomes, organizational effectiveness, cost-effectiveness, business models, reimbursement alternatives, and increased pharmacy access points under the evolving reimbursement policies of the Patient Protection and Affordable Care Act (ACA) 2010. It is evident that the need to continue out-of-the-box thinking and push the boundaries of pharmacy services promotes pharmacy businesses while creating better health outcomes for the patient population at large (Arya et al., 2013).

One practice model included academic-practitioners partnering with middle-sized pharmacy chain store owners and individual pharmacy owners to establish a learning healthcare system on interprofessional pharmacist and physician-driven medication therapy management to implement person-centered collaborative care focused on medication-use processes to address medication-related problems in patient-centered medical homes, federally qualified health centers, and behavioral health systems. Additional innovative models can be created related to specialty physician practices, renal facilities, on-site outpatient clinics for health centers, skilled nursing facilities, long-term care facilities, critical access hospitals, and creative medication therapy management practices for other unique population health models.

The learning healthcare system can include a special consortium created between pharmacy organizations, health systems, and payer organizations to contract with healthcare systems across the United States on implementing learning healthcare systems. This approach would firmly establish the business model of pharmacist-driven medication therapy management while creating annual supplemental pay-for-performance payment for healthcare systems to invest in creating quality-of-care feedback loops for population health. This additional funding stream can further ensure sustainable profitability of pharmacist-driven medication therapy management across all healthcare systems, preventing siloed program setups.

### **For Healthcare Providers**

Healthcare Providers design their medication therapy management services by the 2008. A description of medication therapy management services in Minnesota received a grant to implement medication therapy management services in the 48 county areas in Minnesota. This included funding to train and foster a chain of community pharmacists to provide these services as well as take the first steps in further research to determine rural proof models for service sustainability. As the services are completed, the majority of rural pharmacists trained in the grant project will continue to provide medication therapy management services with minimal outside funding. Purpose of Study: An overview of the methods and models used to introduce

pharmacy providers to medication therapy management and the proposal of a more extensive multi-prong project to continue training and support for enhancing the overall use and sustainability of the medication therapy management process. Rate medication therapy management plan adherence and utilization at 1 month, 3 months, and 6 months post-discharge. Rates of medication therapy management implementation. The findings of this review support medication therapy management as a valuable health care intervention. The majority held favorable attitudes towards accreditation as a mechanism to promote medication therapy management. Best and age categories 30-39 years and 50-59 years had a higher likelihood of supporting a role for accreditation than other age categories. Formal education and training with disability-related curricula need to be developed and implemented with a focus on medication therapy management. Healthcare Providers develop their medication therapy management services by utilizing new ways to provide individualized care as pharmacists believe medication therapy management services deepen patient-pharmacist relationships. They provide opportunities for patients to disclose and clarify their thoughts about their medications. This in turn enables pharmacists to clarify patients' needs and concerns about their medications. Training workshops and practice-based training are essential for improving pharmacists' ability to provide medication therapy management services. Training workshops help pharmacists on how to deal with specific issues in their daily practice that are concerned about provision issues. Most pharmacists express a desire to have more in-depth training on individual medication therapy management services besides workshops. Increasing the availability of short courses or online training of specific aspects of medication therapy management services is necessary.

### **For Policymakers**

As modern healthcare is increasingly intertwined with the affordable access to services and medications, patient safety, and integrated quality of care, care providers and providers' associations that are included in legal framework and study settings are worthy of more advocacy and further exploration. This study may provide strong evidence to use the findings as a building block of strong rationales for such advocacy. The associations are encouraged to review the domain competence of pharmacists, and supporting national legislation and law elaboration that account for the best practice of an inter- and multi-disciplinary approach involving medications.

Moreover, as health human resources are tight in many jurisdictions, and pharmacy, midwifery, reconciliation, and behavioral sciences are given lesser attention despite their critical roles in preventing the deterioration of health and care, these medications- and implementation-focused professions and issues may be positively approached by addictions researchers or public policy audiences. As dispensing is not commonly addressed or visible in research and collaborations elsewhere, it would be widely beneficial for CARE and watch CARE to endorse pharmacy practice and medications instead of just medicines.

There is a line in the first Nightingale, "it is difficult to separate these two things: the profession of nurse and the profession of keeping an account". "As a profession, nursing means a calling which should do as many impossible things as possible in the way of invention. In doing it, it should be grateful to mankind because otherwise, for invention is the advance knowledge which they can have. It should thus be scientific and above everything utilitarian." These may be said more generally on the relationship between various health professions. The broadest purpose is to broaden healthcare professions in academia or research, funding agencies, health system or policy, and the civil society or consumers.

As most educated persons, all healthcare professionals are responsible for combating

disinformation or misconstructions with very little savings of humanity's health as well as of pharmaceuticals. Funds on freedom of speech and guarantees of information safety were urged to be set for public and private sectors as properties of commons. However, as knowledge is always marketed, far more funds' grants on health knowledge stringent and wide publishing and direct approach to individuals are equally worth considering to tolerate developing countries' particulars (Arya et al., 2013).

### **Future Directions**

An acceptability process, such as active engagement of stakeholders to co-create value, is vital in the implementation of new health-promoting processes (Arya et al., 2013). Therapists may coordinate the CTC, aiming to engage practitioners or organizations in acceptance work. This dual position is difficult, because therapists often need to negotiate agreements with stakeholders who may have very different priorities. Still, individual motivation or concern may encourage therapists to perform this acceptability work even when it strays outside their formal role.

This study involved a unique collaboration between the research team and therapists in Patient Support Program (PSP) telephonic treatment. Together, they developed a robust and realistic acceptability process, which was continuously adapted to suit the needs, priorities, and work patterns of its various stakeholders. A graduated implementation scheme was proposed based on insights gained through assessment of acceptability throughout the build-up and initial implementation of the CTC. This was intended to minimize threats to CTC delivery, while fitting within the standard working process of therapists.

The proposed implementation scheme includes 1) processes to build the CTC, 2) multiple workshops for multiple stakeholders to generate and negotiate agreements, 3) an initial phase in which coordination of coordinators and therapists is limited, and 4) gradual roll-out of the CTC through additional workshops. The future research needs to ensure continued improvement of the CTC by monitoring the outcome of implemented actions and continued adjustment based on evaluations, stakeholder needs, and new developments in telephonic psychosocial care. Other remote and/or telephonic health-promoting processes could benefit from this process. The role of a societal design team to involve those affected (in terms of importance and motivations) but also to communicate possible unwanted effects and the need for trade-offs is essential for building a new telephonic workflow. A focus on improving usability for all participants is also needed in future implementation research.

### **Conclusion**

The adoption of a comprehensive medication therapy management (MTM) service at the student pharmacy based on a study design and data collection practices proves successful by meeting outcomes measures (Arya et al., 2013). The study discusses MTM service models; the overall service model; recruitment of volunteer peers and mentor pharmacists; training; peer pharmacy visits; post-visit assessment; results; lessons learned; and conclusion. MTM services combine review of medications for appropriateness and safety and direct patient care. Both peer and mentor pharmacists provided MTM follow-ups and received low ratings in these areas. Mentor pharmacists' MTM pages were generally deemed useful, informative, well-organized, and complete. Future directions are discussed.

Pharmacist-driven MTM services, including adherence, safety, efficacy monitoring and routine medication therapy review, have been positively associated with improved clinical outcomes. Further research is needed to elucidate the relationship between specific pharmacist-led

activities, type of beneficiaries and various outcomes. Changes in lipid and systolic blood pressure were most positively affected by collaboration with other health care professionals and working in a hospital/community pharmacy, respectively. Those negatively associated with clinical outcomes were the selection of beneficiaries, provision of face-to-face consultations and starting a new pharmacist-led service in 2017 or 2018. Questions assessed the role of the recipients of the pharmacist-driven MTM service in providing and implementing it; their attitudes toward its effect on emergency service usage, health care costs, medication adherence, and awareness; and the link between implementation and research issuance frequency, income, scholarly productivity, and health maintenance organizations.

There is a lack of information regarding academic performance on the final first-professional pharmacy examination, pre-pharmacy GPA, practice and professional experience in implementing MTM, and knowledge of MTM assignment and reimbursement possibilities. The study was limited to MTM services applied or previously collaborated with medication reconciliation. Results cannot be generalized outside Switzerland and adherence of 70% to the selection criteria diminished validity, but wells scores on stringent criteria attested to representativeness. Causal relationships between correct answers and publication frequencies could not be assessed. Further studies on service implementation or efficacy are needed.

## References

- Arya, V., Pinto, S., & Khan, T. (2013). Awareness of and Readiness for Medication Therapy Management Among Community Pharmacists in New York City: Results from a Focus Group. [PDF]
- Lester, C., L. Helmke, J., N. Kaefer, T., R. Moczygemba, L., & R. Goode, J. V. (2014). Integrating Components of Medication Therapy Management Services into Community Pharmacy Workflow. [PDF]
- Henderson, A., Brooks, K., Richey, J., & Thompson, V. (2019). MEDICATION THERAPY MANAGEMENT: Empowering the Patient. [PDF]
- Nuffer, W., Dye, L., & Decker, S. (2019). Integrating Pharmacist MTM Services into Medical Clinics as Part of a Health Department Partnership Project. [ncbi.nlm.nih.gov](https://ncbi.nlm.nih.gov)
- Jo Digatono, A. (2011). A Description of Medication Therapy Management Services in Minnesota. [PDF]
- H. Ramsey, L. (2014). Patient Perceptions of Medication Therapy Management Targeted for Adherence following the Provision of Influenza Immunizations by Student Pharmacists: Preliminary Findings. [PDF]
- E. Dodson, S., F. Ruisinger, J., A. Howard, P., E. Hare, S., & Joseph Barnes, B. (2015). Community pharmacy-based medication therapy management services: financial impact for patients. [PDF]
- M. Rife, K., E. Ginty, S., M. Hohner, E., R. Stamper, H., F. Sobota, K., & R. Bright, D. (2012). Remember Your MEDS: Medication Education Delivers Success. [PDF].