As presently constructed, the current chronic self-care management paradigm is failing. Few patients fully understand the chronic disease(s) they are diagnosed with, let alone keep them under control. Poor self-care and behavior can have deleterious effects on a patient and more largely on society. The need for more primary care physicians presents an opportunity for other members of the healthcare team to take on a greater patient care role. As one of the most accessible healthcare professionals, community pharmacists are taking an active role to manage patients with chronic conditions.

Diabetes is a life-long disease that is on the rise, particularly in the United States, the United Kingdom, as well as many other areas of the world. A diagnosis of diabetes brings about new medications and lifestyle adjustments for each patient creating a growing need for effective diabetes care. This is where community pharmacists come into play. In fact, patients with diabetes visit a community pharmacy five times as often as their own primary care physician. Moreover, patients with diabetes visit a community pharmacy 3-8 times more often than other patients.

While many patients present to the pharmacy with diabetes, it is not uncommon for many of these patients to also have hypertension. Hypertension alone affects 1 billion people worldwide. However, patients with diabetes are at an increased risk for cardiovascular problems such as myocardial infarction and stroke. Through proper treatment, along with engaging in a healthier lifestyle, it is possible to lower a patient’s blood pressure which in turn reduces the incidence of cardiovascular events. Hypertension may be one of the most common diagnoses, but it is controlled in only a handful of patients. For example, in the United States less than 50% of patients with diagnosed hypertension have adequate blood pressure control. Heart disease continues to be a leading cause of death and as many as 7 out of 10 deaths are due to chronic illnesses.

As a way to engage and support patients in self-managing their chronic conditions, community pharmacists provide medication therapy management (MTM). This service involves a pharmacist reviewing a patient’s medication list, identifying drug therapy problems, making interventions, and ultimately optimizing drug therapy. Consequently this minimizes the risk of adverse events and drug interactions. The goal of MTM is to lead patients to better health outcomes. The accessibility and
knowledge of pharmacists play a significant role in achieving this. In the United States, 93% of the population lives within 5 miles of a community pharmacy. This makes it possible for repeated interactions with a pharmacist which allows for improved coverage of all aspects of self-care and behavior in comparison to a single visit. This is particularly key for eliciting change in hypertension and diabetes patients. In the case of diabetes self-management, adherence to diet, physical activity, proper medication use, and self-monitoring of blood glucose are all necessary to achieve favorable health outcomes. Given the complexity of self-care it is more likely that these patients will participate in pharmacy’s MTM programs.

It is also essential that any intervention involves a patient-centered approach. The rate-limiting step of managing a chronic disease is the health behavior change of a patient. Simply counseling about exercise and nutrition may not be sufficient to lead patients towards healthier lifestyle choices. By incorporating and addressing a patient’s interests, skills, abilities, and barriers, a patient will be more likely to make appropriate lifestyle modifications.

**Lifestyle Factors**

Social history measures such as exercise, smoking and/or alcohol use, and caffeine consumption must be considered when it comes to leading patients to better clinical outcomes. To sustain positive results, pharmacotherapy should be supplemented with lifestyle modifications. Among the health benefits of diet and exercise is a decrease in A1C level, which is particularly important for patients with diabetes. However, it may take years before patients are willing to make adjustments to their diet, exercise, and even smoking habits. Patients with chronic illnesses are asked to make many lifestyle changes and to sustain these new behaviors over time, but this often can be challenging for patients. Community pharmacists who provide consistent education and positive reinforcement can help to maintain these adjustments. They can provide the motivation patients need and ultimately make it much more likely that patients achieve their set goals. When patients are given flexibility for self-managing their conditions they tend to focus on lifestyle adjustments that are of personal significance to them. This is something healthcare providers should consider when creating action plans for their patients.

Appropriate self-care and behavior change cannot take place without active participation from the patient. One of the main goals that many patients with diabetes should strive for is weight loss, because it has been associated with a reduced risk for mortality, cardiovascular disease, and other comorbid conditions. By helping patients make the right diet and exercise choices, pharmacists can help to noticeably reduce patients’ weight and body mass index in a matter of three months. Moreover, in one study of individuals following pharmacist-delivered MTM, patients in the study group significantly (p<0.05) increased the number of days per week they participated in diet and diabetes self-care activities (1.25 more days/week) compared with the engagement of the control group (0.73 more days/week). Some of the changes that can take place to achieve weight loss include reducing portion size, increasing meal frequency (e.g. from three to six meals per day), and substituting simple carbohydrates with complex carbohydrates.
Within 6 months, community pharmacists can also help to improve the hours patients spend performing physical activity. The greater the amount of moderate and vigorous exercise the more significant the improvement in A1C levels. One way in which patients can increase their physical activity is by carrying out an additional 20-30 minutes per day of exercise. Mehos et al. reported physical exercise, diet, and foot care all underwent significant improvements following pharmacist intervention, while those in the control group saw no improvement in any of the categories.

Aside from changes in body weight and physical activity level, pharmacists have helped patients improve blood cholesterol, LDL levels, blood glucose, as well as fruit and vegetable intake. Pinto et al. also reported smoking, caffeine, and alcohol consumption all decreased while exercise increased in the study group. It is interesting to note that following discontinuation of MTM, one study found rates of smoking cessation to be higher in the intervention group than in the non-MTM group. Since smoking is known to increase the risk of complications associated with diabetes and vascular diseases, this effect on tobacco abstinence demonstrates the importance of pharmacist-delivered education for sustained lifestyle management.

However, not all studies have found a lasting change in patients after medication therapy management was discontinued. Abdelkarem and Sackville pointed out that while 27% of patients in their study at three months improved their diet, exercise, foot care, and self-testing behavior, at 6 months and 24 months mean scores had returned to original values. This signifies that community pharmacists may need to find ways to assure self-care management becomes a sustained change. For example, the authors recommended ongoing reminder packages in order to maintain patient self-care activities and behavior.

Self-monitoring of blood glucose (SMBG) is an important self-care activity for type 2 diabetes patients as it has a strong correlation with longer life expectancy and quality of life. One study found younger participants performed self-monitoring of blood glucose more consistently than did older patients. Pinto et al. suggested those patients with a great knowledge of their disease state were more likely to use glucometers to monitor blood glucose. In contrast, those patients who experienced advancements in their clinical outcomes became less likely to SMBG. Muller et al. discovered that 83% of patients made at least one mistake when measuring blood glucose levels using their own device. At the beginning of the study, 61% of patients made mistakes that potentially led to inaccurate readings. However, following MTM, this percentage dropped to 24% of patients indicating that pharmacists can effectively provide education on how to use glucometers. Pharmacists can play an important role in enhancing self-care activity in the areas of blood glucose monitoring, general diet, and foot care for patients with diabetes. In addition, community pharmacists may encourage patients to receive additional care from specialists as needed. Patients who visit specialists can potentially improve their performance at work and the quality of their lives. At least two studies report community pharmacist intervention increased the number of diabetic patients who visited an ophthalmologist and podiatrist for eye and foot examinations respectively. Thus, MTM can address several different avenues of chronic disease care.
BLOOD PRESSURE MONITORING

Patients may also choose to monitor their blood pressure at home\(^2^8\). Home monitoring has several benefits including: the opportunity to differentiate every day blood pressure levels from elevations resulting from apprehension in the physician’s office; active participation of the patient in managing their condition; measuring patient response to antihypertensive medications, and possible reduced drug expenses\(^2^3\). The increased sales of self-monitoring blood pressure devices reveals there is a growing trend among patients with hypertension as well as health-conscious individuals to self-manage their condition and/or monitor their general health\(^2^8\). Lam and Guirguis found that two thirds of studied hypertensive patients believed their blood pressure was ‘about right’ and less than a third perceived it to be ‘high’. Furthermore, 60% of patients monitored their blood pressure monthly, but less than half of patients performed blood pressure monitoring at home\(^8\). These numbers indicate a need for healthcare providers to assist hypertensive patients with their awareness and knowledge along with their self-monitoring. Community pharmacists have been shown to make an impact on hypertensive self-care and behavior change as well as compliance with therapy\(^2^9,3^0\). Therefore, pharmacists should have a greater involvement in educating patients on how to utilize blood pressure monitors for at home use in order to help patients self-manage their condition. This in turn would allow more hypertensive patients the ability to adequately control their blood pressure\(^2^3\).

CHRONIC DISEASE KNOWLEDGE

Pinto et al. highlighted pharmacists were able to increase disease knowledge among diabetes and hypertension patients from baseline to each follow-up visit. Patients who acquire knowledge about their condition improve their self-efficacy and become more motivated to take care of themselves. When patients obtain greater disease awareness they are better at adhering to their medications\(^1^8\).

Among patients with diabetes, Mehos et al. noted how implementing a pharmacist-delivered diabetes education program was beneficial for disease-state knowledge along with enhanced self-care and behavior\(^2^5\). Ali et al. not only found improvements in diabetes knowledge following community pharmacist intervention (P=0.018), but also advances in quality of life (P=0.001), belief about the need for treatment (P=0.004) and fewer concerns over medication (P<0.001)\(^6\). However, there is still room for improvement when it comes to pharmacists providing education to patients with diabetes. One study pointed out that while most members of the intervention group claimed to be adherent to their medications, there were times when some had difficulty understanding dosing instructions, which led to brief periods of non-adherence\(^2^2\). Guirguis et al. discovered that a little more than two-thirds of patients knew their blood pressure levels, but only about half or a quarter of patients knew their A1C and low-density lipid-C (LDL-C) levels respectively. Therefore, there is an opportunity for pharmacists to assist with both patient understanding of diabetes and hypertension in addition to patient comprehension of laboratory values\(^3^1\).

This idea is also supported for patient-directed hypertension care. The lack of knowledge and self-care activities taking place among many patients with chronic conditions presents an opportunity for pharmacists to provide patient education to augment adherence and health. Lam and Guirguis found
that those patients who were educated by their pharmacists about hypertension health risks and target blood pressure levels were more likely to perform self-monitoring of blood pressure and have improved awareness of their condition. For instance, Robinson et al. noted that patients who received MTM services were more likely to report that they took their medications as prescribed compared with the control group. Another study found that following pharmacist-provided MTM, patients’ disease-state knowledge dramatically increased (p<0.005) especially in the areas of diet and lifestyle modification. Patients who have a greater understanding of their chronic illness are more likely to behave in ways that promote their own health.

ADHERENCE

Medication non-adherence is a concern among the diabetes population, as 30-50% of patients do not take their medications as prescribed. Community pharmacists can play an integral role in helping to improve adherence rates among patients with diabetes. Type 2 diabetes is typically treated using 5-8 medications in order to best control blood glucose, cholesterol, and blood pressure levels. As the drug regimen becomes more complicated and patients have to take medications more than 1-2 times per day, adherence and overall self-care declines. This complexity leads to poorer health outcomes for patients with diabetes, but sufficient community pharmacist intervention can help to combat this trend. Pharmacists have been shown to improve patients’ knowledge, well-being, adherence, and self-management skills. It is important to note that the nature and intensity of the pharmacist intervention can impact the extent to which pharmacists are able to impact these aforementioned patient areas.

Adherence is even more of an issue among hypertension patients. The World Health Organization estimated that approximately 50-70% of patients with hypertension do not take their medications as directed. Therapeutic complexity has also been linked to nonadherence in this patient population, as more treatments and doses are associated with lower adherence. Perseguer-Torregrosa et al. point out that adherence rates can differ slightly based upon the method of measurement. Pill count is a method that is considered the ‘gold standard’ for assessing adherence (the methods often used in clinical practice however include the Morisky-Green and Haynes-Sackett tests). The authors found using the pill count method, approximately 66% of hypertensive patients in the study had at least some difficulty adhering to their medications. Other studies have considered prescription refill records and self-reported adherence and have arrived at similar results.

Regardless of the method of measurement, community pharmacists have been shown to positively impact adherence rates as well as blood pressure levels. One study found a significant mean increase in not only the number of patients who adhered to their prescribed medications (16.7%), but also to self-blood pressure monitoring (46%), aerobic exercise (46%) and alcohol moderation (33%). Since hypertension is asymptomatic, it is not uncommon for patients to perceive an acceptable quality of life but to also be nonadherent. Perseguer-Torregrosa et al. suggested patients who perceive a good quality of life are less aware of the vascular risks of their condition and thus become less adherent to their medications. Another factor found to be connected with adherence is the number of years of known hypertension diagnosis. In other words, the longer the patient had hypertension, the greater the...
adherence. Community pharmacists and other healthcare providers should consider these trends and realize that it takes more than just a single encounter or intervention to consistently improve adherence.

**CHRONIC DISEASE CONTROL**

A multicomponent pharmacist-delivered intervention may also be significant for achieving glycemic control in patients with diabetes. Krass *et al.* indicated that with such an intervention results included: improved medication adherence, weight loss, increases in physical activity, and more frequent interactions with the pharmacists. Additionally, the researchers found improvements in blood glucose, hemoglobin A1C levels, quality of life, and blood pressure control in the intervention group. These findings can be significant given that the majority of hypertensive patients do not reach target blood pressure goals. One possible explanation for this lack of control in patients with hypertension is nonadherence to drug therapy. Robinson *et al.* supported nonadherence as a reason and mentioned that although the pharmacists delivered intensive efforts to improve blood pressure control, only 50% of patients were able to achieve goal levels. One review involving 139 studies found 59% of patients take at least 80% of their antihypertensive and/or diabetes medications. The authors of this review believed there was more to control than just adherence to treatment and, recommend lifestyle interventions including sufficient exercise, salt restriction, and weight loss. Other studies have pointed to suboptimal treatment regimens as the reason for poorly controlled hypertension. Whatever the reason may be, it appears that community pharmacists can help to alleviate this problem. In the Robinson *et al.* study it was found that 50% of those patients who received MTM over a 12 month period and had suboptimal blood pressure control at baseline (defined as >140/90 mmHg), achieved control at the end of the study, compared with 22% in the control group (p < 0.05). Another study involving a similar pharmacist intervention set-up found control to be achieved in 79% of the intervention group compared with 55% in the control group. While many patients do not have control over their chronic condition(s), community pharmacists can serve as the bridge connecting patients to better health.

**CONCLUSION**

Many patients with chronic illnesses do not successfully self-manage their own conditions. Low health literacy is one prevailing issue among patients with diabetes and/or hypertension that needs to be addressed, as patients may not understand the disease(s) or what to do to achieve optimal outcomes. This not only leads to poor adherence to medication, but also to poor adoption of important lifestyle changes such as exercise and dieting. Without control over a chronic condition, a patient may experience unfavorable clinical outcomes and poor quality of life.

Community pharmacists are the medication experts, but many even go beyond this role. Through engaging patients in MTM, pharmacists become guiding figures within their communities. While literature supports the positive impact community pharmacists can have on patient self-care and behavior change, pharmacists’ services often go underutilized. However, if we can find a way to further link those with uncontrolled chronic conditions to community pharmacists who can effectively provide patient care there will be several notable transformations. First, we will be able to increase patient knowledge of their chronic conditions. This will then establish a foundation for the promotion of appropriate patient
choices and conduct leading to a reduction in the number of hospital and/or emergency room visits. Community pharmacists will aid in directing patients towards healthier lifestyles, but they can only go so far in helping patients maintain the changes. It will ultimately be up to the self-care and behavior of each individual to determine the overall clinical outcome.

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REFERENCES


