The Diabetic Patient and Non-Adherence

Education, communication, and technology can make the difference.

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Worldwide, chronic diseases are the leading cause of morbidity and mortality.[1] The World Health Organization (WHO) has stated that "increasing adherence may have greater effect on health than improvements in specific medical therapy."[2] With the increasing prevalence of chronic diseases worldwide, non-adherence to medical therapy plays a larger role in healthcare costs.[1] According to the National Diabetic Statistics Report, in 2017 30.3 million people—or roughly 9.4% of the U.S. population—had diabetes.[3] Current models project that by 2050 the prevalence of diabetes in the United States population will range from 21% to 33% at the extremes of models, with a moderate estimate of 25% to 28%.[4]

This increase in prevalence can be explained in part by current trends in the United States, as the rates of obesity and hypertension increase along with an aging population.[5] Diabetes places patients at an increased risk of comorbid conditions while negatively impacting morbidity and mortality overall, thus ultimately increasing the burden to the healthcare system.[6] The pathophysiology of diabetes makes patients prone to a wide array of vascular and neurological complications.[4] Comorbid conditions include cardiovascular disease and disabling conditions such as diabetic retinopathy, nephropathy, and neuropathy, among others, which culminates in an age-adjusted increase in mortality.[7]

The need to adhere to medication plans has been recognized as a major factor to improve quality of life and increase the cost-effectiveness of healthcare.[1,8] The World Health Organization (WHO) defines adherence as "the extent to which a person's behavior—taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a healthcare provider."[9]

Poor treatment adherence has been related to the complexity of the treatment regimen.

Insufficient adherence compromises treatment efficacy, further exacerbating co-morbid conditions in diabetes.[10] According to the WHO, developed countries average only a 50% adherence to long-term therapy for chronic illnesses.[9] Thus a cycle of non-adherence further exacerbates comorbid conditions and their accompanying morbidity and mortality while eventually increasing healthcare costs.[11] The complexity of managing the comorbid conditions is why diabetes accounts for the largest budget expenditure for many healthcare systems.[12]

Worldwide, management of diabetes accounts for nearly 12% of medical spending.[13] This spending is expected to approximately triple over the next two decades, with predictions that the United States will be spending over $230 billion by 2030.[13,14] However, studies have demonstrated that through increased adherence, overall healthcare costs can be reduced.[14]

For years, studies have documented the clinical benefits of open and interactive physician-patient communication in managing chronic disease.[15,16] Patient satisfaction with care has been shown to be directly related to the amount of information given by the physician, particularly in regard to the treatment plan.[16] Additionally, patients are more likely to have poor control of their diabetes and other chronic conditions if they are less involved in their treatment plan and less engaged with the physician.[15] Even though research shows that patient adherence to diabetic treatment is multifactorial, there are multiple aspects that can be addressed by physicians.

Although certain demographic factors have a negative impact on glycemic control, proper physician communication with patients who have diabetes is associated with good glycemic control, even in patients with low health literacy. An observational study assessed the relationship between physician communica-

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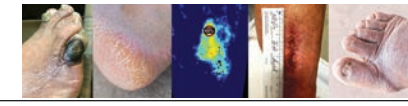

Non-Adherence *(from page 121)*

tion strategies and glycemic control. Patients were more likely to have a lower HbA1c level when physicians assessed the patient's understanding of a change in the treatment plan and provided further explanation if the patient did not fully comprehend the changes. Some such changes included an alteration in medication schedules or dosing and addition of a new medication. However, during this study physicians assessed patient comprehension only 13% of the time new information was presented.[17]

In another study, patients with type 2 diabetes completed a questionnaire about communication with their physician over the past year. Patients who felt discriminated against (based on education, income, race or ethnicity) or patients who felt they experienced hurried communication with their doctor were more likely to miss insulin injections. "Hurried communication" was defined as doctors speaking too fast, using complex words, ignoring what patients told them, and appearing distracted or bothered if the patient asked several questions. Additionally, patients who documented hurried communication were more likely to have increased diabetes-related distress, which was linked to higher HbA1c levels and poor insulin adherence.

Furthermore, there was an improvement in insulin adherence when patients reported that physicians explained results.[18] A medication adherence survey on WebMD asked adults with type 1 and type 2 diabetes to assess medication adherence from a patient perspective. Patients reported that 43% of their physicians counseled them about diabetes, and 52% reported that they either attended diabetic education classes or were given printed information about their condition. Among patients who did not receive physician counseling or printed information or attend diabetic education classes, only 48% reported being adherent to medication. In contrast, 60% of patients who reported they received counseling from their physician were adherent to medications.[19]

Poor treatment adherence also has been related to the complexity of the treatment regimen. Research has shown a significantly lower compliance rate for any regimen that requires more than once-daily dosing. Some patients also worry about the long-term risk-benefit ratio of medications and are skeptical of their treatment—-which is, unsurprisingly, linked to poor adherence.[20] This is another area where open physician communication and patient education could lead to significant improvement. If patients leave the office informed on the risks and benefits of their current treatment regimen and understand why they may require treatment more than once daily, dosing compliance rates could be increased.

Even when physicians properly counsel patients about their diabetes and treatment regimen, some patients inevitably have questions or concerns in between appointments, regarding either the information given during that visit or the management of their disease in general. Khurana, et al.[13] report that among patients who left the office unclear regarding the information given to them during a visit, 48% of them would have liked to call their physician with unanswered questions; however, only 19% actually did call their physician to ask for clarification. A further 21% turned to Internet searches instead, and others reported seeking advice from family and friends or waiting until the next scheduled appointment. Over 80% of patients in this population stated that they would be interested in using e-mail, text messaging, or cellular apps to increase communication with their physician. New electronic methods may be the answer to bridging the communication gaps to improve physician-patient communication, thereby increasing medication adherence.

The Role of Technology

Mobile technologies and technology in general are being used increasingly in healthcare to help reduce the burdens of chronic disease and to facilitate improved adherence. A recent meta-analysis focused on the role of health information technology on glycemic control in patients with type 2 diabetes mellitus and found that the use of this technology was associated with a reduction in HbA1c across all trials, with statistical significance found in 62.5% of cases.[21]

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Other researchers have examined the advantages of using patient portals within EHRs to increase medication adherence.[22] In 2019, the Electronic Medication Complete Communication (EMC2) strategy, which has four main components, was pilot tested in Chicago, Illinois and Chapel Hill, North Carolina, in attempts to increase medication adherence in patients with diabetes.[22]

When physicians placed orders for certain medications, the EHR would provide a reminder to counsel patients on proper use and side effects of the medication. If the order was for a higher-risk medication, a patient education handout and an FDA medication guide about that drug was automatically printed for the patient in addition to their after-visit summary. The after-visit summary included information about the patients' specific treatment plan, medication list, and other information regarding their most recent visit. A week later, patients with an EHR portal account received a survey to assess medication adherence, with the results forwarded to the clinic staff through the EHR. Of the patients whose responses required follow-up, 81% were contacted within 24 hours and the remaining 19% were contacted within 5 days of survey completion. Overall, patients reported high

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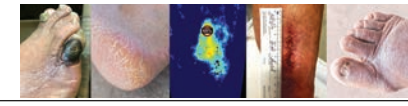

Non-Adherence (from page 122)

levels of satisfaction with the portal experience, physician counseling, and the printed medication summaries. This study using the EMC2 strategy highlights one way technology can be used to improve patient satisfaction and medication adherence, which, in turn, can reduce healthcare costs and disease burden.[22]

Technology also can play a role in diabetes management in the form of smartphone applications. In 2013, there were over 3600 apps designed for patients with chronic conditions. The condition associated with the highest number of apps was diabetes.[23] Furthermore, in 2018, 81% of U.S. adults owned a smartphone, so there is no question that a large number of patients have access to these mobile apps.[24]

The question then becomes whether these apps truly are helpful in the management of diabetes. A recent systematic review examined the usability and effectiveness of mobile apps for use in diabetes. This study revealed that HbA1c decreased anywhere from 0.15% to 1.9% from baseline in patients using mobile apps as part of their diabetic management. However, most patients were using mobile apps along with other tools to manage their diabetes, making it difficult to distinguish how much of the effect came from the use of those apps.

Additionally, usability ratings on the diabetic apps were collected from patients, experts, and caregivers, with ratings ranging from poor to average.[25] Although more research is needed to determine the efficacy of these mobile applications, this is another option to discuss with patients who own a smartphone, because many of these apps are free to download and offer another management option to patients.

Non-adherence in the management of chronic disease is well known to increase healthcare expenditure, as well as morbidity and mortality. As the prevalence of diabetes continues to increase, it becomes even more important to focus on increasing adherence rates in patients with diabetes to reduce the incidence of co-morbid conditions and ease the burden on the healthcare system. Several studies have documented the low adherence rates in diabetic patients while highlighting that physicians are in a position to increase adherence through their interactions with patients. Such interactions include educating patients on their disease and having interactive discussions with patients about their treatment regimen. The widespread use and accessibility of technology, such as smartphones, offers another potentially beneficial strategy for combating non-adherence and could be discussed with patients as well. **PM**

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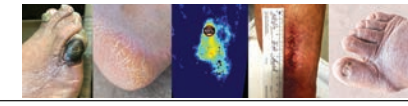

Non-Adherence *(from page 124)*

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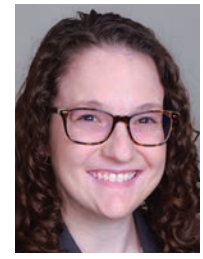

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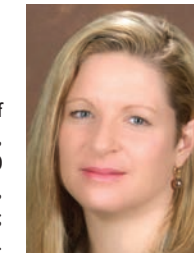

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