

# Health Literacy Interventions: Improving Diabetic Care and Reducing Healthcare Costs

## INTRODUCTION

More than 100 million Americans have diabetes or prediabetes, which is approximately one third of the U.S. population.<sup>4</sup> Management of diabetic patients costs the US healthcare system around \$327 billion annually.<sup>6</sup> According to the Director of the Center for Disease Control and Prevention (CDC), Dr. Brenda Fitzgerald, “Now more than ever, we must step up our efforts to reduce the burden of this serious disease.”<sup>4</sup> One effective measure to reducing the burden of diabetes is health literacy interventions. According to the National Institute of Health (NIH), health literacy is “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”<sup>8</sup> Over the years it has become increasingly difficult to navigate our complex healthcare system. Even for those who can access reasonable medical care, it may be difficult for patients, especially those with low health literacy, to understand and properly implement treatment guidelines. Diabetic patients in particular may benefit from health literacy interventions in order to improve treatment adherence. In the context of diabetic patients, this entails properly taking medications for hyperglycemia, along with close monitoring of blood glucose levels. This brief will identify the impacts of poor health literacy specifically among diabetic patients, current interventions to improve health literacy, the impact of patient education on healthcare costs and clinical outcomes, and how successful interventions can impact local as well as federal policy change.

## BACKGROUND

In the US, over 90 million people do not properly adhere to medical treatment, of many chronic medical conditions, due to poor health literacy. Based on the 2003 National Assessment of Adult Literacy (NAAL), over a third of U.S. adults—77 million people—have basic or below basic health literacy.<sup>13</sup> They frequently experience difficulty with common health behaviors, such as following directions on a prescription drug label. Poor health literacy disproportionately impacts people of lower socioeconomic status, minorities, immigrants and the elderly. For example, 27% of people on Medicare and 30% of people on Medicaid have below basic health literacy.<sup>13</sup> Low health literacy has been associated with: higher rates of emergency room (ER) visits, delayed diagnosis, poor adherence to chronic disease management, limited ability to recall information post clinic visits, higher rates of hospitalization and increased mortality.<sup>5</sup> These outcomes result in higher morbidity and mortality along with increased medical costs.

Patients with diabetes in conjunction with poor health literacy are at an even greater risk for disability and death due to poor disease management. Current adherence to diabetic treatment is staggeringly low with only 55% of patients achieving adequate glycemic control.<sup>10</sup> The top contributors to poor compliance among diabetic patients include limited understanding of their disease and treatment regime, misconceptions regarding the efficacy of treatment, and real or perceived barriers such as potential medication side effects. All of these factors can be modified via improved patient engagement and education. The widespread suboptimal management of diabetic patients correlates with an increased risk of complications, including heart disease, stroke, kidney failure,

peripheral vascular disease, and blindness.<sup>5</sup> Therefore, it is vital to improve health literacy in the U.S. through the implementation of evidence based interventions.

## LITERATURE REVIEW

### *General Health Literacy Interventions*

There are several examinations used to assess individual health literacy, but one question that serves as a convenient and accurate measure is, “How confident are you at filling out medical forms by yourself?”<sup>12</sup> By asking this simple question, providers can assess a patient’s health literacy, and use evidence based toolkits to improve patient understanding and treatment adherence.

Studies show that health literacy is significantly related to knowledge, self-efficacy, and self-care.<sup>13</sup> In a meta-analysis of 71 studies examining the efficacy of health literacy interventions, 65 showed a positive Association between the intervention and improved health literacy; results were statistically significant ( $p < .001$ ) and clinically significant with a 22% increased rate of health literacy when compared to the those who did not receive the intervention [ $r = 0.22$ , 95% CI = 0.18, 0.25].<sup>9</sup> In addition, 101 studies looking at the impact of health literacy interventions on treatment adherence showed a 16% higher risk of nonadherence among patients who did not receive the intervention.

### *Improved Diabetic Patient Outcomes*

Systematic reviews of randomized controlled trials show that the provision of individual education resources for diabetics facilitate patient-provider communication, increase compliance to medication and achievement of behavioral goals, and improve health outcomes.<sup>10</sup>

Along with improving quality outcome measures, health education programs help diabetic patients reduce their blood glucose levels. A retrospective study shows that patients enrolled in diabetes self-management education (DSME) program experience a 3-

fold decline in HbA<sub>1c</sub> blood glucose levels compared to control group patients without DSME [OR = 2.80; CI = 2.05, 3.83;  $P < 0.0001$ ].<sup>2,9</sup>

Potential study limitations include variances in methodological approaches. In addition, some studies only show marginal improvements in health literacy and adherence to treatment. It is important to identify why certain health literacy programs are successful in order to inform future interventions.

### *Healthcare Costs*

Based on 2003 Medical Expenditure Panel Survey (MEPS) data, low health literacy in the US approximately costs the economy between \$106 billion and \$238 billion dollars annually in medical expenditures.<sup>13</sup> This correlates to roughly 7% -17% of all personal healthcare expenditures. These higher medical costs for people with low health literacy are primarily due to poor navigation of healthcare services resulting in expensive emergency room admissions instead of less costly and more effective visits with known internal medicine providers. Other indirect costs linked to poor health literacy include lost time, lost wages, and poorer quality of life.

Inadequate health literacy in conjunction with mismanaged care for diabetic patients has created a huge financial burden. From 2012 to 2017, the cost of treating diabetes in the US has risen by 26%. Approximately 30% of the annual \$327 billion in diabetes spending is for prescription medications used to treat complications of the disease, while another 30% is for hospital inpatient care.<sup>6</sup> These expensive complications and hospitalizations directly result from poor preventative diabetic care. The general notion is to blame the victim for poor health literacy instead of attempting to engage vulnerable patient populations in a primary care setting. The US has great potential to minimize these costs and improve patient care through health literacy interventions.

### ***Current Interventions and Policies***

The most successful health literacy interventions have often incorporated some of the following: patient education via handouts, audiovisual media, online resources, educational software programs, web-based educational applications, and social support resources. One toolkit proven to be effective in improving health literacy and patient outcomes is The Diabetes Literacy and Numeracy Education Toolkit (DLNET).<sup>9</sup> This intervention specifically addresses blood glucose monitoring, medication administration and dietary instructions. The informational guides are at a low-grade reading level, use color coding, pictures and step-by-step instructions. Two randomized controlled trials demonstrate how the toolkit helped reduce HbA<sub>1c</sub> by a median difference of 0.70.<sup>8</sup> Another evidence based health literacy intervention is the Living with Diabetes Guide. At least 90% of patients who used the guide were successful in achieving behavioral goals related to blood glucose self-monitoring, medication and dietary adherence, and exercise.

In 2010 the U.S. Department of Health and Human Services wrote National Action Plan to Improve Health Literacy, and this plan outlines seven goals to improve health literacy via policy change.<sup>11</sup> Some states have taken steps to improve the accessibility of health information. For example, The California Medical Assistance Program (Medi-Cal) worked with Berkeley School of Public Health to develop a guidebook explaining enrollment options using simple language and available in English, Spanish, and Chinese.<sup>11</sup>

### **POLICY IMPLICATIONS**

While there are policy level plans to improve patient education and engagement such as the National Action Plan to Improve Health Literacy, there is currently no federally enforced provision of health literacy interventions. Collaboration among

federal and state level policy makers with local healthcare systems may enhance implementation of these national guidelines.

At present, the positive health outcome experienced by diabetic patients enrolled in health literacy programs disappears shortly after the intervention ends. In order for there to be meaningful long-term improvement in quality management of diabetic patients, funding needs to be provided for continuous follow-up and monitoring by diabetic nurses and other healthcare providers.

Healthcare providers will be instrumental in the implementation of policy enforced health literacy interventions. As part of the implementation, medical personnel will need to be educated regarding the host of factors leading to suboptimal diabetes management. Through health literacy interventions, providers can guide patients to implement new health behaviors in the context of their daily routine. This will lead to improved patient engagement across their care continuum.

Potential barriers to implementation include Limited medical staff and limited funding of resources necessary to integrate these programs. However, as shown in the literature review, improved health literacy leads to reductions in the rate of potentially preventable diabetic complications and hospitalizations. Policy change and insurance-based reimbursement for health literacy services, are essential to improve health literacy and patient outcomes while reducing long-term medical costs.

## ADDITIONAL RESOURCES

1. **The Diabetes Literacy and Numeracy Education Toolkit (DLNET):**  
<https://www.ncbi.nlm.nih.gov/pubmed/19240246>
2. **California Health Literacy Initiative**  
<http://cahealthliteracy.org>
3. **Centers for Disease Control and Prevention Simply Put: A Guide for Creating Easy-to-Understand Materials**  
<http://1.usa.gov/YFi4Ab> Centers for Medicare and Medicaid Services
4. **Living with Diabetes Guide**  
[https://www.acponline.org/system/files/documents/patients\\_families/products/brochures/protected/living-with-diabetes-english.pdf](https://www.acponline.org/system/files/documents/patients_families/products/brochures/protected/living-with-diabetes-english.pdf)
5. **National Action Plan to Improve Health Literacy**  
[https://health.gov/communication/hlactionplan/pdf/Health\\_Literacy\\_Action\\_Plan.pdf](https://health.gov/communication/hlactionplan/pdf/Health_Literacy_Action_Plan.pdf)

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