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Introduction

Diabetes mellitus affects over 29 million people in the United States, and more than 20% of health care spending is for people with diagnosed diabetes.^{1,2} In the “Diabetes Belt,” of which this study’s population are part, the prevalence of diabetes is especially high.^{2,3} The debilitating effects of diabetes can be lessened through glycemic control⁴⁻⁶, yet rates of control are low nationwide, especially in medically underserved areas.^{3,7,8} Diabetes self-management education is an important component of patient activation and subsequent glycemic control.^{6,9-17} However, the majority of people with diabetes do not receive structured diabetes education.^{11,12} Despite the established research for intensive self-care programs, primary care clinics in medically underserved areas often face barriers to implementation.¹⁷⁻¹⁹ Health systems are increasingly interested in ways primary care clinics can utilize existing resources more effectively to improve diabetes care.

Simple routine distribution of print health educational materials, such as brochures, fact sheets, and leaflets, is an evidence-based intervention with the potential to help primary care clinics improve diabetes self-care at low-cost. Previous research has demonstrated that primary care clinics typically have access to print health educational materials²⁰⁻²² and their patients are interested in receiving these materials.²³⁻²⁸ Furthermore, routine delivery of print educational materials has a solid evidence base for effectiveness in improving patient care.²⁷⁻³⁰ However, evidence suggests that this simple, low-cost educational intervention is often underutilized.^{22,23,31-33} For example, McClinchy and colleagues found patients to be frustrated with the lack of nutritional leaflets available in primary care offices.²³ Few studies have

systematically evaluated patient perspectives on the accessibility of print diabetes educational materials in primary care settings.

In addition, little is known about how patients perceive different delivery approaches for print health educational materials in primary care settings. Studies have demonstrated that patients prefer to receive educational materials from their clinician during the consultation.^{23,27} McVea and colleagues found that clinicians distributed the majority of patient educational materials, but provided the materials at only 7.4% of visits.³³ Self-selection of educational materials by patients is another method of distribution employed in waiting areas and exam rooms. McVea and colleagues observed that patients rarely selected patient educational materials, but posited that this could be a consequence of the inconvenient locations of materials.³³ In addition, privacy concerns may inhibit self-selection in certain locations in a clinic. Craven and colleagues demonstrated that patients were significantly more likely to pick up mental health educational materials in the exam room than in the waiting room.²⁴ Despite these observational studies on clinician use and patient behavior, to our knowledge, no previous studies have rigorously evaluated delivery, satisfaction, and preferred delivery approaches for diabetes educational materials from the patient perspective.

The current study aims to assess the perspectives of diabetes patients in medically underserved areas regarding their access to, delivery, satisfaction with, and preferred delivery methods for print diabetes educational materials in primary care. The authors hypothesized that diabetes patients would report low levels of satisfaction with existing diabetes educational materials and current availability of materials in the primary care clinics they attend. Given the rise of consumer-driven health care, the authors hypothesized that patients would want more

readily available diabetes educational materials for patient browsing and selection. Lastly, because of the value patients place on one-on-one patient-provider relationships, the authors hypothesized that patients would prefer for their providers to deliver and explain the materials during primary care visits personally.

Methods

Study Design and Patient Recruitment

This cross-sectional study employed patient exit surveys at nine primary care clinics participating in the Patient-Centered Outcomes Research Institute-funded Management Of Diabetes in Everyday Life (MODEL) study.³⁴ The MODEL study was designed to assess baseline delivery of enhanced usual care components in a comparative effectiveness trial of motivational text messaging, health coaching, and enhanced care (emphasizing routine delivery of low literacy diabetes education material) in supporting self-care decisions for medically underserved African-Americans with uncontrolled diabetes. The nine clinic study sites were selected to reflect the diversity of primary care practice sites in medically underserved rural and urban areas in the West Tennessee and North Mississippi area and included two large federally qualified health center clinics, four primary care group practices affiliated with a large health system, one small hospital affiliated private practice, and two large academically affiliated family medicine practices.

The authors sought to survey at least ten patients per clinic with a goal of collecting more than 90 patient surveys. Research staff visited each of the nine clinics at least twice in July 2016. Clinic personnel identified potential participants from patient records who were scheduled for a routine or follow-up primary care office visit. Adults (≥ 18 years) with an existing

diagnosis of diabetes were offered participation. There were no exclusion criteria, and every effort was made to recruit all eligible patients. The study and survey instrument were approved by the UTHSC Institutional Review Board #16-04612-XP.

Survey Design

In developing the patient exit survey, investigators conducted a thorough literature review and consulted primary care providers, diabetes educators, and health literacy researchers. The following key domains related to print health educational materials in primary care settings were identified: current access, delivery, satisfaction, and preferences regarding delivery and content. Since existing instruments were not available for these domains, the investigators used key informants and provider experts to develop a tool with perceived high face validity. The survey was designed to be concise and suitable for patients with low health literacy. Once drafted, the survey underwent extensive piloting with patients and providers.

Measures

The survey assessed patient characteristics, current experience with print diabetes educational materials at the clinic (i.e., access, delivery, satisfaction), and preferences for materials provided in the future (i.e., preferences regarding content and delivery). Patient characteristics assessed included age, gender, race, zip code, education completed, insurance, comorbidities, current tobacco use, age of diabetes diagnosis, type of diabetes, and self-reported health status using modified questions from the Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance Survey from 2016.³⁵ In addition, health literacy was assessed using a well-validated one-item survey question: *How confident are you filling out medical forms by yourself?*^{36,37}

Access to print diabetes educational material was measured using a single categorical question to assess receipt of such materials on the day of their routine primary care visit. Patients who did not receive materials that day were asked if they had received materials at a prior visit.

For patients who had ever received educational materials from their primary care clinic, delivery of materials was assessed by asking patients to recall the timing, location, method, source, and content of the materials received. Patient satisfaction with materials was measured by assessing the level of agreement with five statements using a 5-point Likert scale (5 = Strongly Agree), regarding their overall value, readability, understandability, helpfulness, and perceived usefulness.

Patient preferences for educational material content and delivery were measured by assessing preferences for location, source, availability, and content using level of agreement with statements with a 5-point Likert scale. Preferred frequency for material distribution was measured using a single categorical question to assess how often patients want to get materials from their clinic.

Survey Administration

Due to differences in the nine participating clinics, the research team developed modified protocols for each clinic. In general, clinic personnel identified eligible patients and alerted research staff when the patient was available to be interviewed. The survey was administered either in the exam room or upon discharge in another room in the clinic. To minimize delays in the clinic and wait time for the participants, the survey could be separated into two sections with patient characteristics questions administered before the provider had

seen the patient, whereas the remainder of the survey needed to be administered after the patient had seen the care team. Although the survey was intended to be self-administered, the research team developed protocols for modified interviews if participants needed assistance. For Spanish-speaking patients, a clinic staff member or family member interpreted the survey. Similarly, research staff read the survey questions aloud for patients with reading difficulties. In order to maintain survey question reliability, research staff members prepared for potentially challenging sections and met periodically to review progress.

Statistical Analysis

All data from the cross-sectional survey were analyzed using SAS® version 9.3 (SAS Institute Inc., Cary, NC). The FREQ procedure was used to summarize dichotomous and categorical responses and estimate proportions of responses to various items. Likert-scale responses were assumed to represent underlying scales that were continuous and normal. Overall satisfaction was defined as the mean score for the five satisfaction items. The MEANS procedure was used to estimate means and standard errors, summarizing such variable responses. The TTEST procedure was used to test the hypothesis that men and women or African-Americans and Caucasians expressed the same levels of satisfaction with the existing diabetes education materials.

Results

Ninety-nine diabetes patients were recruited from the nine participating clinics for participation in the study. Of those, three were deemed ineligible, and ten declined participation resulting in 86 participants for an overall response rate of 89.6%. The median number of responses for each clinic was 9 (range 5 – 18). As shown in **Table 1**, survey

respondents were female (59.3%) and African-American (68.6%), with a mean age of 58 (range 20-84, S.D. 13.4). Average age at diabetes diagnosis was 45 years. The majority of patients (76.7%) reported type 2 diabetes, but 14.7% were unsure of their diabetes type. One-third (33.7%) screened positive for limited health literacy. Of note, 93% of diabetes patients reported one or more additional chronic conditions, with high blood pressure (86.0%) and high cholesterol (59.3%) being most common. Participants rated their overall health at 2.7 on a scale of 1 (poor) to 5 (excellent).

Table 1: Characteristics of Diabetes Patients Visiting Primary Care Clinics in Medically Underserved Areas (N=86)	
	Mean (S.D.)
Age	58.0 (13.4)
Age at diagnosis with diabetes	45.4 (14.0)
Self-reported health status (Likert scale with 5 = excellent)*	2.7 (0.9)
	n (%)
Gender	
Female	51 (59.3)
Male	35 (40.7)
Race	
Black or African American	59 (68.6)
White	22 (25.6)
Other	4 (4.7)
American Indian or Alaska Native	1 (1.2)
Ethnicity	
Hispanic or Latino	3 (3.5)
Education	
Grades 1-8	3 (3.5)
Grades 9-11	11 (12.8)
Grade 12 or GED	31 (36.0)
College 1-3 years	27 (31.4)
College 4 years or more	14 (16.3)
Insurance	
Private insurance	33 (38.4)
Medicare	24 (27.9)
Medicaid/TennCare	21 (24.4)
Self-pay	8 (9.3)
Health literacy	
Inadequate	29 (33.7)
Adequate	57 (66.3)
Current tobacco use[§]	21 (24.4)
Comorbidities	

Type I Diabetes	8 (9.3)
Type II Diabetes	66 (76.7)
Diabetes, unknown type	12 (14.0)
High blood pressure	74 (86.0)
High cholesterol	51 (59.3)
Arthritis	34 (39.5)
Depression	18 (20.9)
Other health conditions	18 (20.9)
Congestive heart failure	11 (12.8)
Asthma	10 (11.6)
Kidney disease	9 (10.5)
Chronic obstructive pulmonary disease	7 (8.1)
One or more additional chronic conditions (besides diabetes)	80 (93.0)

* How would you rate your overall health? (5=Excellent, 4 = Very Good; 3= Good; 2= Fair; 1 = Poor)

§ Do you smoke cigarettes or use any other form of tobacco?

Regarding access to print diabetes educational materials in the primary care clinic, patients reported one of three experiences: 1) thirty-one patients (36%) received materials on the day of the survey; 2) thirty-four (39.5%) failed to receive materials that day, but had received materials previously at the clinic, or 3) thirty-one (24.4%) had never received diabetes educational materials from the clinic. As shown in **Table 2**, of those who ever received materials (N = 65), the majority (79.3%) received material in the exam room, given without request (70.4%), and provided directly by a doctor, physician’s assistant, or nurse practitioner (66.7%). Most of the provided diabetes material content related to healthy eating (89.1%) and physical activity (72.7%).

	N (%)^{*§}
Timing (When the patient received materials)	
Before entering the exam room	8 (15.4)
When in the exam room	38 (73.1)
After leaving the exam room	10 (19.2)
Location (Where patients received materials)	
Waiting room	5 (9.4)
Hallway	2 (3.8)
Exam room	42 (79.3)
Front desk	3 (5.7)
Checkout desk	5 (9.4)
Other location	3 (5.7)

Method (How patients received materials)	
Picked up by self	13 (24.1)
Requested from doctor or staff	6 (11.1)
Given without request	38 (70.4)
Other	1 (1.9)
Source (Who gave patients materials)	
Doctor, physician's assistant, or nurse practitioner	30 (66.7)
Nurse or Medical Assistant	15 (33.3)
Other staff personnel	1 (2.2)
Content (Topics of materials)	
Healthy eating	49 (89.1)
Physical activity	40 (72.7)
Taking medicine correctly	33 (60.0)
Other topic ^s †	10 (18.2)

As shown in **Table 3**, patients who received print diabetes educational materials from the clinic reported high levels of satisfaction with the materials they received (mean satisfaction 4.6 on a 5-point Likert scale), easy readability (mean 4.7), and high understandability (mean 4.5). No significant differences were found in satisfaction with diabetes educational materials by either gender or race.

Table 3: Patient Satisfaction with Print Diabetes Educational Materials in Primary Care (N=59)*	
Patient Agreement with the following statements (Likert scale with 5 = Strongly Agree)	Mean (SD)†
I like materials that were given to me at this clinic	4.64 (0.48)
The materials are easy to read	4.66 (0.51)
The materials are easy to understand	4.53 (0.65)
The information in the materials will help me care for my diabetes	4.60 (0.65)
I will read or use the materials after I leave the clinic	4.61 (0.72)

*Sample size of participants that received materials and completed the scale.

†Means and SDs only include valid responses.

As shown in **Table 4**, respondents reported the highest preference for receiving print educational materials from their doctor (mean 4.8 on a 5-point Likert scale) and in the exam room (mean 4.5). But, of note, patients also reported that it would be very helpful to have educational materials available in the waiting room (mean 4.3) and to be able to select

materials for themselves (mean 4.1). Patients responded with high preference (mean 4.3 to 4.7) for each of the seven different topics. Approximately half (44.7%) reported that they would like to receive materials more often.

Table 4. Patient Preferences for Content and Delivery of Print Diabetes Educational Materials in Primary Care (N=86)*	
(5-point Likert Scale with five = Very Helpful)	Mean (SD)
Location (Where is most helpful to receive materials)	
Waiting room	4.29 (1.16)
Hallway	2.65 (1.57)
Exam room	4.51 (1.08)
Front reception desk	3.55 (1.50)
Checkout desk	3.83 (1.40)
Source (Who is most helpful to provide materials)	
Doctor	4.79 (0.63)
Nurse	4.35 (1.14)
Medical Assistant	4.11 (1.20)
Office Staff (reception or checkout desk)	3.54 (1.45)
Availability (How helpful is it to have materials available for patients to choose for themselves)	4.05 (1.22)
Content (How interested are patients in the following topics)	
Healthy eating	4.67 (0.87)
Physical activity	4.42 (1.06)
Weight loss	4.29 (1.26)
Taking medicine correctly	4.36 (1.26)
Information about diabetes	4.55 (0.94)
Recommended diabetes care	4.52 (1.03)
Checking blood glucose	4.39 (1.13)
Frequency (How often do patients want to get materials from this clinic)	n (%)
More often	38 (44.7)
No change	45 (52.9)
Less often	2 (2.4)

* Means and SDs only include valid responses.

Discussion

This study is among the first to document that patients in medically underserved areas frequently do not receive print diabetes educational materials during their regular primary care visits. In this study, only one third (36.0%) of diabetes patients received diabetes educational materials on the day of their visit and a quarter of patients (24.4%) had never received diabetes

educational materials on any visit to their primary care clinic. These findings are particularly concerning given the long-established benefits of routine delivery of low-literacy health educational materials.²⁷⁻³⁰ While primary care clinics are routinely prescribing patients expensive glucose monitors and test strips despite their demonstrated lack of benefit for most diabetes patients,^{38,39} they are struggling to provide basic educational services that are of proven benefit. From the patient's perspective, primary care clinics can improve access to diabetes educational materials both in the waiting and exam rooms, and providers can distribute materials more frequently. When it comes to distributing high quality, low literacy diabetes educational material to every patient every time, this study suggests that primary care clinics serving the most vulnerable patients are failing to do the simple well.

The authors' hypothesis about patient satisfaction with diabetes educational materials available in the clinics was not substantiated: patients reported high levels of satisfaction with materials. This finding may provide reassurance that clinics do not need to acquire new materials to satisfy patients. In regards to the delivery of materials, participants found it most helpful when materials were given directly by their provider, affirming the hypothesis and supporting the literature.^{23,25,27,28} This is the first study to our knowledge to demonstrate that patients are also highly interested in opportunities to browse and select materials for themselves. With the rise of consumer-driven health care, this finding is not surprising.⁴⁰ However, there is a tension as patients demand a more active role in care, clinics are adjusting to more value-based care.⁴⁰ To meet the changing landscape, primary care clinics can at a minimum provide patients with access to health education materials. Also of note, 33.7% of

survey respondents had limited health literacy. This study reaffirms the importance of distributing low literacy materials in populations with low health literacy.

This study is subject to a number of limitations. First, this study only assessed access to diabetes-specific print educational materials, and therefore findings may not account for other health educational materials patients received in the clinics. Second, the study's findings are potentially subject to selection bias in the survey administration through volunteer bias and non-response bias. However, the study minimized volunteer bias through survey design and implementation that minimized time spent by patients' participating in this study. And the research team recruited patients with the help of providers and nursing staff to build trust and rapport with the patients. In addition, the research team minimized the non-response bias by visiting clinics multiple times and minimizing barriers to participate through collaboration with clinic personnel. The authors were unable to survey patients who missed their clinic appointments on the days surveys were conducted. These patients may have the greatest needs for increased diabetes educational materials. However, few people refused to participate or were unable to complete the survey due to illness or mental capacity suggesting that selection bias was effectively minimized. And although a previously non-validated survey tool was used, the survey instrument had high perceived face validity with the key patient and provider informants who assisted in developing and piloting the instrument.

The current study provides new insights into the current experience of diabetes patients in primary care clinics in medically underserved areas and raises important issues for future research. In particular, research is needed to evaluate the comparative effectiveness of alternative approaches to delivering diabetes educational content and self-care support. These

comparative effectiveness studies should directly test and compare traditional approaches to distributing print educational materials with alternative “modern” approaches using technology (e.g., mobile health applications, health-related text messages, or video) and personnel (e.g., health coaches, diabetes educators, or physician counseling). For example, the PCORI-funded MODEL study, of which this study is a part, is directly comparing the effectiveness of health coaching, motivational text messaging, and print diabetes educational materials in improving diabetes self-care.³⁴ Additionally, further implementation research is critically needed to determine the most cost-effective approaches to support self-care using each of these modalities and to determine which modalities are most appropriate for which populations (e.g., urban vs. rural, young vs. old, or low vs. high health literacy). As part of the ongoing MODEL Study,³⁴ there are plans to assess further assess the impact of increasing accessibility of materials in participating primary care clinics in medically underserved areas.

Despite the established benefits of routine delivery of low-literacy print diabetes educational materials, the current study demonstrates that most patients in medically underserved areas do not receive them during routine primary care visits. Vulnerable primary care patients in medically underserved areas are highly interested in receiving educational materials and find them especially helpful when given directly by providers. However, this is the first study to our knowledge to demonstrate that patients are also highly interested in opportunities to browse materials for themselves. From the patient’s perspective, primary care clinics can improve access to diabetes educational materials both in the waiting and exam rooms and providers can distribute materials more frequently. This study provides strong evidence that primary care clinics in medically underserved areas need support and

encouragement for doing the simple well, so that every diabetes patient, every time, gets the high quality diabetes educational material they deserve.

The practical implications of this study are substantial. The study directly indicates specific low-cost ways that primary care clinics serving medically underserved populations can better meet the educational needs of some of their most vulnerable patients. Furthermore, the study suggests that patient exit surveys can be effectively used to monitor progress toward meeting patient needs, suggesting that this might be a routine monitoring approach used to ensure that clinics are meeting their most basic responsibilities. These findings can provide guidance to primary care clinics regarding best practices for improving access and delivery of print diabetes educational materials.

References

1. American Diabetes Association. Economic Costs of Diabetes in the U.S. in 2012. *Diabetes Care* 36:1033-1046, 2013.
2. (CDC) CfDCaP. National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014. Atlanta, GA: U.S. Department of Health and Human Services; 2014.
3. Jackson B, Gutierrez M, Relyea G, et al. Unmet Primary Care Needs in Diabetic Patients with Multimorbidity in a Medically Underserved Area. *Health Serv Res Manag Epidemiol* 4:1-9, 2017.
4. Holman R, Paul S, Bethel M, et al. 10-year follow-up of intensive glucose control in type 2 diabetes. *N Engl J Med* 359:1577-1589, 2008.
5. Turner RC. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 352:837-853, 1998.
6. Chamberlain J, Rhinehart A, Shaefer C, Jr., et al. Diagnosis and Management of Diabetes: Synopsis of the 2016 American Diabetes Association Standards of Medical Care in Diabetes. *Ann Intern Med* 164:542-552, 2016.
7. Cheung BM, Ong KL, Cherny SS, et al. Diabetes prevalence and therapeutic target achievement in the United States, 1999 to 2006. *Am J Med* 122:443-453, 2009.
8. Ko J, Delafield R, Davis J, Mau MK. Characteristics of patients with type 2 diabetes mellitus in two rural, medically underserved communities. *Hawaii J Med Public Health* 72:191-196, 2013.
9. Haas L, Maryniuk M, Beck J, et al. National Standards for Diabetes Self-Management Education and Support. *Diabetes Care* 37:144-153, 2014.
10. Martin AL, Lipman RD. The Future of Diabetes Education Expanded Opportunities and Roles for Diabetes Educators. *Diabetes Educ* 39:436-443, 2013.
11. Siminerio LM, Piatt G, Zgibor JC. Implementing the chronic care model for improvements in diabetes care and education in a rural primary care practice. *Diabetes Educ* 31:225-234, 2005.
12. Siminerio LM, Piatt GA, Emerson S, et al. Deploying the chronic care model to implement and sustain diabetes self-management training programs. *Diabetes Educ* 32:253-260, 2006.
13. Funnell MM, Brown TL, Childs BP, et al. National standards for diabetes self-management education. *Diabetes Care* 35:101-108, 2012.
14. Norris SL, Engelgau MM, Narayan KM. Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials. *Diabetes Care* 24:561-587, 2001.
15. Norris SL, Lau J, Smith SJ, et al. Self-management education for adults with type 2 diabetes: a meta-analysis of the effect on glycemic control. *Diabetes Care* 25:1159-1171, 2002.
16. Chvala CA, Sherr D, Lipman RD. Diabetes self-management education for adults with type 2 diabetes mellitus: A systematic review of the effect on glycemic control. *Patient Educ Couns* 99:926-943, 2016.

17. Renders CM, Valk GD, Griffin SJ, et al. Interventions to improve the management of diabetes in primary care, outpatient, and community settings: a systematic review. *Diabetes Care* 24:1821-1833, 2001.
18. Glazier RH, Bajcar J, Kennie NR, et al. A systematic review of interventions to improve diabetes care in socially disadvantaged populations. *Diabetes Care* 29:1675-1688, 2006.
19. Munshi MN, Segal AR, Suhl E, et al. Assessment of barriers to improve diabetes management in older adults: a randomized controlled study. *Diabetes Care* 36:543-549, 2013.
20. Group TDHES. General practitioners' use of health education material. Results from a nationwide survey in Denmark in 1991. *Fam Pract* 11:35-38, 1994.
21. Stange KC, Zyzanski SJ, Jaén CR, et al. Illuminating the 'black box'. A description of 4454 patient visits to 138 family physicians. *Fam Pract* 46:377-389, 1998.
22. McVea K, Venugopal M, Crabtree BF, et al. The organization and distribution of patient education materials in family medicine practices. *Fam Pract* 49:319-326, 2000.
23. McClinchy J, Dickinson A, Barron D, et al. Practitioner and lay perspectives of the service provision of nutrition information leaflets in primary care. *J Hum Nutr Dietet* 24:552-559, 2011.
24. Craven MA, Nikolaou L, Allen CJ, et al. Patient education materials for mental health problems in family practice: does location matter? *Patient Educ Couns* 56:192-196, 2005.
25. Moerenhout T, Borgermans L, Schol S, et al. Patient health information materials in waiting rooms of family physicians: do patients care? *Patient Prefer Adherence* 7:489-497, 2013.
26. Shank JC, Murphy M, Schulte-Mowry L. Patient preferences regarding educational pamphlets in the family practice center. *Fam Med* 23:429-432, 1991.
27. Sustersic M, Gauchet A, Foote A, et al. How best to use and evaluate Patient Information Leaflets given during a consultation: a systematic review of literature reviews. *Health Expect* 1-12, 2016.
28. Kenny T, Wilson RG, Purves IN, et al. A PIL for every ill? Patient information leaflets (PILs): a review of past, present and future use. *Fam Pract* 15:471-479, 1998.
29. Sustersic M, Jeannet E, Cozon-Rein L, et al. Impact of information leaflets on behavior of patients with gastroenteritis or tonsillitis: a cluster randomized trial in French primary care. *J Gen Intern Med* 28:25-31, 2013.
30. de Bont EG, Alink M, Falkenberg FC, et al. Patient information leaflets to reduce antibiotic use and reconsultation rates in general practice: a systematic review. *BMJ Open* 5, 2015.
31. Kenner MM, Taylor ML, Dunn PC, et al. Primary care providers need a variety of nutrition and wellness patient education materials. *J Am Diet Assoc* 99:462-466, 1999.
32. Frazee J, Griffith J, Green D, et al. So Many Materials, So Little Time: A Checklist to Select Printed Patient Education Materials for Clinical Practice. *J Midwifery Womens Health* 55:70-73, 2010.
33. Smith JL, Levitt C, Franco ED. Innovative system to improve use of patient education materials. *Can Fam Physician* 43:58-62, 1997.

34. Bailey JE. Improving Self-Care Decisions of Medically Underserved African-Americans with Uncontrolled Diabetes: Effectiveness of Patient-Driven Text Messaging versus Health Coaching. 2017; <http://www.pcori.org/research-results/2016/improving-self-care-decisions-medically-underserved-african-americans>. Accessed June 28, 2017.
35. (CDC) CfDCaP. Behavioral Risk Factor Surveillance System Survey Data. In: U.S. Department of Health and Human Services CfDCaP, ed. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2012.
36. Chew LD, Bradley KA, Boyko EJ. Brief questions to identify patients with inadequate health literacy. *Fam Med* 36:588-594, 2004.
37. Wallace LS, Rogers ES, Roskos SE, et al. BRIEF REPORT: Screening items to identify patients with limited health literacy skills. *J Gen Intern Med* 21:874-877, 2006.
38. O'Kane MJ, Bunting B, Copeland M, et al. Efficacy of self monitoring of blood glucose in patients with newly diagnosed type 2 diabetes (ESMON study): randomised controlled trial. *BMJ* 336:1174-1177, 2008.
39. Malanda UL, Welschen LM, Riphagen II, et al. Self-monitoring of blood glucose in patients with type 2 diabetes mellitus who are not using insulin. *Cochrane Database Syst Rev* 2012.
40. Shrank WH. Primary Care Practice Transformation and the Rise of Consumerism. *J Gen Intern Med* 32:387-391, 2017.