

ORIGINAL RESEARCH

An Innovative Tool in Resident Education to Assess Knowledge in Vulnerable Patients with Poorly-Controlled Diabetes: The Spoken Knowledge in Low Literacy in Diabetes Scale

Derek J. Cheung, MD and Karen Kim, MD

Introduction

Low health literacy is common in vulnerable patient populations and is a key barrier to self-management of chronic disease. Improving diabetes-specific knowledge and self-management skills through focused patient education may improve control of diabetes and prevent complications. Patient education and consistent use of the teach-back method by resident physicians are potential ways to promote health literacy in teaching clinics.¹⁻³

The Spoken Knowledge in Low Literacy in Diabetes Scale (SKILLD) is a 10-item, orally-administered, open-ended, objective tool to assess knowledge about diabetes. The SKILLD scale has been validated and higher scores on the scale are correlated with better control of hemoglobin A1c and self-management behaviors. It has also been shown to have similar properties when translated in Spanish and used in Mexican-American populations.⁴⁻⁶

We describe a pilot approach to patient education using the SKILLD to assess patient knowledge and to teach patients important diabetes-specific knowledge. Additionally, we evaluated the SKILLD use in a teaching clinic at a safety net hospital as a brief resident assessment and education tool.

Methods

The SKILLD as described in Rothman et al. was used for this study.⁴ The SKILLD was translated into Spanish by a certified healthcare interpreter for use with Spanish-speaking patients. The answers to the SKILLD questions were scored for a maximum of ten possible points. Patients who had a recent hemoglobin A1c (HbA1c) level of greater than 9 mmol/mol were identified from the resident primary care clinic at Olive View-UCLA Medical Center (OVMC), an LA County Department of Health Services safety net facility.

The SKILLD was orally administered by a resident physician to a convenience sample of routinely-scheduled patients with HbA1c levels greater than 9 for in-office, administration in either English or Spanish, selected by the patient. After patients completed the SKILLD, they were informed of the correct answers and were given brief explanations of the answers. Spanish phone interpreter services were used to aid in inter-

pretation of patient responses and to explain SKILLD answers for Spanish-speaking patients. The score obtained on the SKILLD, duration of time to complete the administration and education process, and most recent HbA1c was recorded for each patient.

A separate online survey was administered to OVMC internal medicine residents. The survey asked for post-graduate year level, self-reported use of the teach-back method in the primary care clinic, and included an on-line version of the SKILLD survey to assess diabetes knowledge.

Associations between the variables as described above were evaluated using the t-test. Specifically, associations among mean SKILLD score, HbA1c, duration of time required for completing the SKILLD, and language used were evaluated. For the resident online survey, associations between mean SKILLD score, use of the teach-back method, and year of training were evaluated. The study protocol was reviewed by the facility IRB and the study was determined to be exempt.

Results

The SKILLD was administered to eight patients (2 English-speaking and 8 Spanish-speaking, Table 1) with mean Hgb A1c level of 9.9 (N=8 patients, SD 0.79). Mean duration required to complete the SKILLD administration and education process was 10.3 minutes (SD 3.45), with the process in Spanish (mean 11.5 minutes) taking much longer than in English (mean 6.8 minutes; $p=0.09$ between groups). For patients, the mean percentage of SKILLD questions correct was 53.8%.

Patients had knowledge deficits ($\leq 50\%$) in multiple domains, namely in knowledge of long-term complications of diabetes, normal fasting blood sugars and HbA1c, and recommended frequency and duration of exercise for persons with diabetes. The question debriefing and education process engaged patients, and prompted further questions from patients regarding diabetes, including questions regarding self-management and additional means to improve their HbA1c.

There were 29 respondents to the resident survey (Table 2). Half (50%) of resident survey respondents reported using the

teach-back method as part of routine patient education. Overall, residents scored an average of 8.9 out of 10 possible points on the SKILLD. The mean percentage of SKILLD questions correct was 86.8% for PGY-1 residents, and 92.0% for PGY-2 and PGY-3 residents (p-value 0.32).

Discussion

Cost-effective and time-efficient patient education interventions may help improve diabetic care in vulnerable patients. The initial goal of this project was to identify and evaluate a patient education tool that might be feasible to complete by residents during scheduled primary care visits at OVMC, a safety net facility. In the validation study by Jeppesen et al., the average time to complete the SKILLD was 3.75 minutes.⁵ However this did not including the patient education time. Our pilot study found a mean of 10.3 minutes to complete the SKILLD, which may be too long to add to routine scheduled primary care visits.

Much of the extra time for Spanish speaking patients was the time required to access phone interpreter services.

Resident knowledge appeared adequate to provide patient education based on SKILLD without additional training. However less than 70% of residents correctly answered the SKILLD questions regarding hypoglycemia and the recommended frequency of foot exam, so additional training may be needed.

Finally, the use of the SKILLD as a form of assessment and education for patients may serve as a useful adjunct to empower patient self-management skills in the setting of a dedicated appointment scheduled to discuss diabetes management. The sample sizes for both parts of the study were limited. Future studies may be feasible if self-administered questionnaires could be completed while waiting for the appointment and having efficient “warm” handoffs between diabetic educators, mid-level providers, and physicians in individual or group visits for patients with poorly controlled diabetes.

	Total N = 8	English N = 2	Spanish N = 6	p-value
HbA1c, mean (SD)	9.9% (0.79)	9.4% (0.42)	10.1% (0.85)	0.342
Duration for completing SKILLD, mean in minutes (SD)	10.3 (3.45)	6.8 (0.35)	11.5 (3.15)	0.09
Percent of SKILLD questions correct, mean (SD)	53.8 (30.2)	60.0 (28.2)	51.7 (33.1)	0.76
Correct answers to individual SKILLD questions:				
Treating low blood sugar (Q3), n (%)	8 (100.0)	2 (100.0)	6 (100.0)	
Reasons for foot exams (Q5), n (%)	5 (62.5)	2 (100.0)	3 (50.0)	
Signs/symptoms of low blood sugar (Q2), n (%)	5 (62.5)	1 (50.0)	4 (66.7)	
Frequency person w/ diabetes check feet (Q4), n (%)	5 (62.5)	2 (100.0)	3 (50.0)	
Long-term complications of uncontrolled diabetes (Q10), n (%)	4 (50.0)	1 (50.0)	3 (50.0)	
Normal fasting blood glucose/blood sugar (Q7), n (%)	4 (50.0)	1 (50.0)	3 (50.0)	
Signs/symptoms of high blood sugar (Q1), n (%)	4 (50.0)	0 (0)	4 (66.7)	
Frequency and duration of exercise for person w/ diabetes (Q9), n (%)	3 (37.5)	1 (50.0)	2 (33.3)	
Frequency and importance of eye doctor (Q6), n (%)	2 (25.0)	1 (50.0)	1 (16.7)	
Normal HbA1c (Q8), n (%)	2 (25.0)	1 (50.0)	1 (16.7)	

Table 2: Resident Spoken Knowledge in Low Literacy in Diabetes Scales (SKILLD) by year				
	Total N = 29	PGY 1 N = 19	PGY 2/3 N = 10	P-value
Teach Back (yes), y (%)	14 (50.0)	8 (42.1)	6 (60.0)	0.377
Percent of SKILLD questions correct, mean (SD)	88.6 (13.0)	86.8 (14.2)	92.0 (10.3)	0.316
Correct answers to individual SKILLD questions:				
Reasons for foot exams (Q5), n (%)	29 (100.0)	19 (100.0)	10 (100.0)	
Frequency and importance of eye doctor (Q6), n (%)	29 (100.0)	19 (100.0)	10 (100.0)	
Treating low blood sugar (Q3), n (%)	29 (100.0)	19 (100.0)	10 (100.0)	
Frequency and duration of exercise for person w/ diabetes (Q9), n (%)	29 (100.0)	19 (100.0)	10 (100.0)	
Long-term complications of uncontrolled diabetes (Q10), n (%)	29 (100.0)	19 (100.0)	10 (100.0)	
Normal fasting blood glucose/blood sugar (Q7), n (%)	27 (93.1)	18 (94.7)	9 (90.0)	
Signs/symptoms of high blood sugar (Q1), n (%)	23 (79.3)	14 (73.7)	9 (90.0)	
Signs/symptoms of low blood sugar (Q2), n (%)	22 (75.9)	13 (68.4)	9 (90.0)	
Normal HbA1c (Q8), n (%)	22 (75.9)	14 (73.7)	8 (80.0)	
Frequency person w/ diabetes check feet (Q4), n (%)	18 (62.1)	11 (57.9)	7 (70.0)	

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