

Level of Health Literacy Predict the Self-Care Activities in Middle Age with Type 2 Diabetes Mellitus

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Abstract

Introduction: Diabetes mellitus has increased over the years. Adequate self-care activities will improve outcomes optimally. Health literacy was the important factor that affected self-care activities. The prediction of health literacy to define the capability of self-care activities need to be identified. Health literacy among adults with T2DM can be the guidance of health worker to give the intervention in improving self-care activities. To examine the health literacy as a predictor of self-care activities among T2DM. A cross-sectional analytical study conducted in 101 patients in Primary Health Center with T2DM. **Methods:** Self-reported questionnaires were demographic and clinical characteristics questionnaire, HLS-EU-16Q and SDSCA Indonesian Version. Research was conducted after ethical clearance has been approved. Multivariate analysis with hierarchical linear regression and all the data were managed by SPSS v. 20. **Results:** Most of the respondents were in the middle age, female (68.3%), unemployed, secondary education-graduated (45.5%), having diabetes <5 years (65.3%), with no complication and history of smoking. The middle age and health literacy related to self-care activities with $P = 0.03$ and $P = 0.02$, respectively. The age and the presence of complication explained 9.8% and 2% of the self-care activities. The predictors that included age, the presence of complication and health literacy ($P < 0.05$) explained 15,3% of the variance in self-care activities among type 2 DM. **Conclusion:** The presence of complication, age and health literacy was significant predictors of self-care activities among people with T2DM in Indonesia.

Keywords: Diabetes mellitus, health literacy, self-care activities, self-care behaviour

INTRODUCTION

Diabetes mellitus (DM) affected 537 million adults globally. The number of people with DM increased 16% in 2019 and would be predicted 643 millions in 2030 and 783 millions in 2045, and also 90% affected by type 2 DM. The first sequence of DM was Middle East-North Africa by 12,2% among seven regional in the world. East-Asia was the third rank after West-Pacific by 11,3% and following by Indonesia in the seventh rank of DM prevalence.^[1] The result from national survey in Indonesia, prevalence of DM diagnosed by physician by 2% among Indonesian (≥ 15 y.o). Daerah Istimewa Yogyakarta was the highest prevalence of DM (2,6%), followed by DKI Jakarta, North Sulawesi and East Kalimantan.^[2]

Diabetes required to be controlled and managed adequately to avoid severity and complication occurred. Diabetes complications were responsible for crucial morbidity and mortality incidence.^[3] The long-term complications of diabetes

were widely divided into microvascular and macrovascular, and microvascular complication was the higher prevalence than the macrovascular complication.^[4] Microvascular complications consisted of nephropathy, neuropathy and retinopathy, whereas macrovascular complications consisted of stroke, and peripheral artery disease (PAD), stroke and cardiovascular disease.^[5]

In Indonesia, PERKENI (an organization among endocrinology physician in Indonesia) has recommended the four pillars of diabetes management. It consisted of education to the DM patients, arrange the diet or healthy eating behaviour, being

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physically active and pharmacological therapy.^[6] Adequate self-management has manifested by adequate knowledge and awareness in supporting self-care activities. Adequate self-management supported patient to make a modification in their dietary or lifestyle.^[7]

The capacity of self-care activities in DM patients supported the adequate management. Self-care activities referred to the health consciousness concept and defined as an eagerness to gain in health and wellness promoting behaviours.^[8,9] Individuals with adequate self-care activities have positive perspectives about their health and have the healthful living.^[8,10] Self-care activities affected decision-making and behaviour related to diabetes management. Self-care varied that included of medicine, exercise or physical activity, sleep and rest, dietary and monitoring in diabetes management.^[11]

Self-care activities related to behavioural change that affected the metabolic and clinical control of patients, control of glycaemic and health-related quality of life among people with diabetes.^[12-14] Self-empowerment supported the achievement of self-care activities. Well-educated patient is one of the strategies to empower patient with diabetes.^[15] Health literacy was positively associated with diabetes knowledge and glycaemic control among diabetes patients.^[16,17] More recently, the concept of health literacy has advanced and it highlighted on the perspective that health literacy means not only the capability needed by an individual to receive health-related information, but also the insistence of the health system concerning the process of information or instructions.^[18,19]

Level of health literacy was vary among individuals with diabetes mellitus.^[18] Higher levels of health literacy significantly related to better diabetes knowledge and lower levels of HbA1C.^[17,20] Nurse as a health worker need to know how the level of health literacy can predict the self-care activities among diabetes mellitus. The prediction can be used as a guideline to define the capability of self-care activities among patients and can be the guideline to be determined the adequate intervention for diabetes mellitus patients. In addition, extended intervention can be shorten effectively and efficiently by understanding the capacity of self-care activities among patients. This study aimed for examined the level of health literacy as predictor of self-care activities among type 2 diabetes mellitus. This study will answer the following research questions: (1) Are demographic/clinical characteristics and health literacy associated with self-care activities among type 2 DM? (2) Could health literacy predict self-care activities among type 2 DM?

MATERIALS AND METHODS

Research design and setting

This study was cross-sectional analytical design. The research setting conducted at Tegalrejo Primary Health Center in Yogyakarta City between April and June 2021.

Population and sample

Population consisted of 554 patients with type 2 diabetes mellitus and have been registered as patients in Tegalrejo

Primary Health Center in Yogyakarta City. Purposive sampling technique was conducted, and total sample in this study was 101 respondents. Inclusion criteria were determined to acquire eligible respondents. Inclusion criteria consisted of: (1) diagnosed type 2 DM by physician; (2) 18-59 y.o; (3) capable of using Bahasa both orally and in writing.

Data measurement

The variables measured were health literacy and self-care activities. Measurements were conducted one time in this study. Data were collected by three self-reported questionnaires. First questionnaire was about demographic and medical history (age, gender, occupation, education level, duration of diabetes, complication and smoking history). Any complication was assessed by semi-open question in the first questionnaire and also checked from the medical record. The second questionnaire used was Health Literacy Survey-Europe-16 Questionnaire (HLS-EU-16Q), and this questionnaire has been used publicly in European and Asian Countries, as well as Indonesia. The questionnaire consisted of 16 questions, and the answers are categorized dichotomously, that is, “very difficult” and “moderately difficult” answers were scored as 0 and “fairly easy” and “very easy” were scored as 1. All scores were summed up, and the interval of the score was 0-16. The scores are categorized as higher or lower HL based on median score. The higher HL score (higher than mean score) is advised good. The HLS-EU-Q16 had been translated and validated by the Asian Health Literacy Association (AHLA) in Indonesia collaborated with Taipei Medical University team. The content validity index items score for HLS-EU-Q16 was 0,68 and Cronbach Alpha was 0.94.^[21] The last questionnaire was Summary of Diabetes Self-Care Activities (SDSCA). This questionnaire consisted of 25 items about the frequency of achieving diabetes self-care in the prior 7 days, namely general diet, specific diet, exercise, blood-glucose monitoring, foot care, medication and smoking.^[22] The respondents score their adherence to the self-care activities in the past week, ranging from 0 to 7 days. The scoring used was 1-4 (1 = not relevant to 4 = highly relevant). Qualitative reflections were also collected. The content validity index (CVI) and the internal consistency (Cronbach’s alpha) were satisfactory, which are 0.98, and 0.72, respectively.^[23] Based on these data, all the questionnaires were valid and reliable for collecting the data about health literacy and self-care activities.

Data analysis

Descriptive statistics were deliberated to report the univariate data of the demographic and clinical characteristics, health literacy and self-care activities. The normality of the data was evaluated by performing a K-S test ($P > 0,05$) for dependent variable; hence, the data were considered as a normal distribution. Pearson’s correlations were executed to analyse bivariate data among dependent and independent variables. Hierarchical linear regression was executed to examine the association among the demographic and clinical characteristics, health literacy and self-care activities. Variables with a P value less than 0.25 and r score less than 0.8

(none of the collinearity) were entered into the regression model analysis. Furthermore, presumption of multivariate analysis was executed by linearity (p -ANOVA 0.000), existence (mean residual 0), homoscedasticity, independency (Durbin Watson score between 1,55 and 2,46), normality multivariate and collinearity (VIF less than 10).^[24] All the data analysis process was managed by SPSS 20 version.

Ethical aspect

Informed consent was given to respondents before the study was conducted. Respondents who were willing to take part in the research signed the informed consent form to become respondents and respondents who refused to be involved in the research were not forced to be involved. Anonymity and confidentiality of the respondent have been guaranteed. This research has been approved by the Ethics Commission of Alma Ata University number KE/AA/III/10389/EC/2021 to be carried out in accordance with the research protocol. The study followed guidelines of Declaration of Helsinki 1964 and later amendments.

RESULTS

Characteristics of the respondents

Respondent characteristics are shown in Table 1. Most of the respondents were in the middle age, and more than half of the respondents were female (68.3%). Most of the respondents were unemployed, graduated from secondary education (45.5%), having diabetes for less than 5 years (65.3%), with no complication, and no history of smoking. Average of health literacy and self-care activities among respondents were 13 and 52, respectively.

Association among demographic factor, clinical characteristics, health literacy and self-care activities

Association among demographic and clinical factors, health literacy and self-care activities is shown in Table 2. Among all of the independent variables, only two variables that related to self-care activities among type 2 DM respondents, namely age and health literacy. The middle age related to self-care activities, and an older age was related to better self-care activities ($P = 0.03$). Health literacy related to self-care activities with positive correlation, and higher level of health literacy related to better self-care activities ($P = 0.02$).

Predictor of self-care activities among type 2 DM

In total, the regression analysis consisted of five variables: age, gender, level of education, presence of complication and health literacy [Table 3]. Hierarchical regression analysis was executed with three models. In Model 1, demographics characteristic (age, gender, level of education) and self-care activities were entered. Then, clinical characteristic about the presence of complication was entered into the regression analysis into Model 2. In the last step, health literacy was entered into Model 3. The demographic characteristics included in Model 1 explained 9.8% of the variance in self-care activities. When the presence of complication was added in Model 2, the R² increased by 0.02 points, indicating that the presence of complication explained

Table 1: Demographic and Clinical Characteristics, Health Literacy and Self-Care Activities of the Respondents (n=101)

Categories	Subcategories	n	%	M±SD
Age	Less than 45 y.o	8	7.9	
	45-59 y.o	93	92.1	
Gender	Male	32	31.7	
	Female	69	68.3	
Occupation	Unemployed	31	30.7	
	Farmer	11	10.9	
	Entrepreneur	20	19.8	
	Officer	14	13.8	
Education	Others	25	24.8	
	Non-educated	7	6.9	
	Primary education	34	33.6	
	Secondary education	46	45.5	
DM duration	Higher education	14	13.9	
	Less than 5 yrs.	66	65.3	
	More than 5 yrs.	35	34.7	
Presence of complication	Yes	15	14.9	
	No	86	85.1	
History of smoking	Yes	6	5.9	
	No	95	94.1	
Health literacy				13.2±3
Self-care activities				52.04±16.24

Note: DM: Diabetes Mellitus

Table 2: Association among demographic factors, clinical characteristics, health literacy and self-care activities (n=101)

Variables ^a	Self-care activities	P
	r	
Age	0.216*	0.03
Gender	0.129	0.197
Occupation	0.083	0.411
Education	0.121	0.228
DM duration	0.01	0.922
Presence of complication	0.149	0.137
History of smoking	0.002	0.984
Health literacy	0.229*	0.021

* $P < 0.05$, ^aPearson correlation

2% of the variance in self-care activities. Finally, health literacy was then added in Model 3, and this variable explained an additional 3.5% of the variance in self-care activities. The consequential predictors in Model 3 included age, the presence of complication and health literacy ($P < 0.05$). The total R² was 0.153 which indicated that this model explained 15,3% of the variance in self-care activities among type 2 DM.

DISCUSSION

Health literacy

In this present study, the level of health literacy among respondents was vary. Most of the respondents had the better

Table 3: Hierarchical Regression Analysis of Demographic factors, Clinical Characteristics, Health Literacy and Self-Care Activities (n=101)

Variable	Model 1			Model 2			Model 3		
	B	β	VIF	B	β	VIF	B	β	VIF
(Constant)	-11.834			-11.976			-14.366		
Age	15.879*	0.265*	1.049*	15.667*	0.262*	1.049*	12.389*	0.207*	1.134*
Gender	5.507	0.159	1.015	5.568	0.160	1.015	4.914	0.141	1.025
Level of education	2.394	0.166	1.034	2.311	0.160	1.035	1.740	0.121	1.079
Presence of complication				6.377	0.140	1.002	8.739*	0.192*	1.078*
Health literacy							1.112*	0.205*	1.180*
R^2			0.098			0.118			0.153
ΔR^2			-			0.02			0.035
F			3.513			3.200			3.436

VIF=variance inflation factor, * $P < 0.05$

score of health literacy more than the average among the respondents. In contrary, the study from İlhan *et al.*^[25] showed that among T2DM people in Turkey were at inadequate level of health literacy. Inadequate health literacy is also excessive among Iranian patients with type 2 diabetes.^[26] Compared with other studies, the people with T2DM in our study had better level of health literacy.

Self-care activities

In this study, self-care activities were varied among respondents with T2DM. More than half respondents had the self-care activities below from the average. The best self-care was about adherence in prescribed medication (oral medication and insulin), while the worst self-care was about blood glucose monitoring. Most of the respondents were the member of government health insurance and blood glucose monitoring was low in self-care activities, it might be due to the rule in monitoring blood glucose that was prescribed only once for two weeks in primary health centre. Foot monitoring rarely practised by respondents due to the lack of awareness. Monitoring the inner shoes was also rarely practiced due to the wearing shoes was not a routine (especially for unemployed people), and for farmers, they prefer wearing slipper or bare footed. Furthermore, using lotion as rarely practised among respondents due to using lotion was not a routine for men. Lotion was considered as only skin care or cosmetics for women. We compared with other study showed that the community-dwelling older adult in Singapore were not in coping well of diabetes self-care.^[27] In some developing countries, general self-care management also inadequate among Jordanian and Omani.^[28,29] Supported by these findings, people with T2DM among Nigerian had poor self-care activities especially in exercise, blood glucose monitoring and foot care, while the diet management had adequate self-care activities.^[30] The study from da Rocha *et al.*,^[31] the general self-care activities were inadequate among people with T2DM. Medication adherence in self-care activity was satisfactory, while for the physical exercise, it was unsatisfactory in self-care activities among people with T2DM.

Health literacy and self-care activities

These findings revealed that the health literacy related to self-care activities. Respondents with adequate health literacy were more likely to have adequate self-care activities. People with adequate literacy have both knowledge and awareness that supported the adherence to self-care activities. Consistence with other study revealed that health literacy increased confidence in their awareness to select adequate activities in diabetes management.^[32] Health literacy had an indirect pathway in affecting the self-care activities. Health literacy mediated by self-efficacy influenced self-care activities relatively.^[33] In this study, we found that people with older age and the presence of complication also related to self-care activities. These were due to the older age, the more experience they practised. The experience supported the capability of self-care activities among people with T2DM. Consistence with other study revealed that sociodemographic factors including age were related with self-care activities among people with T2DM.^[34-36] Furthermore, the presence of complication related to self-care activities due to the impact of suffering with complication (e.g., retinopathy and neuropathy) that forced people with T2DM to improve their capability of self-care activities. Consistence with other result that revealed a conducive, pleasurable and useful experience related to the judgment of people about the impacts and consequences of their behaviour.^[37,38]

Limitation of the study

There were three limitations in this study. First, the limitation of this study was that respondents with T2DM were recruited from only one health care centre, which may have resulted in selection bias as a consequence of the low level of variation in sample characteristics. Second, this study having small sample size which may not be representative of the entire state population. Additionally, the SDSCA questionnaire is widely use in Indonesia and has the good validity and reliability, but for the point about blood glucose monitoring was not in accordance with the condition in primary health centre in Indonesia. In fact, blood glucose monitoring was prescribed to the T2DM patients only once in two weeks

(for those as a member of government health insurance), which may affect the score of self-care activities among respondents as a consequences of the rule about facility of blood glucose monitoring. Furthermore, foot monitoring was not in accordance with the culture in Indonesia, especially for farmer or unemployed that use only slipper in daily activities. For the future studies, it is recommended to arrange the content about blood glucose monitoring according to the rule and foot monitoring, especially in Indonesia.

CONCLUSION

The study identified that age, the presence of complication, and health literacy were significant predictors of self-care activities among people with T2DM in Indonesia. Health literacy is likely the most significant predictor of self-care activities. Therefore, improving health literacy with education effectively was recommended in improving self-care activities among people with T2DM in Indonesia.

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Authors' contribution

RWR mapped out the concept, design, and definition of intellectual content. RWR also conducted the statistical analysis, manuscript preparation, manuscript editing, and manuscript review. ADS conducted the literature search, data analysis, data acquisition, and manuscript preparation. RWR is responsible for the integrity of this research.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Data availability statement

Authors are willing to share the data on request.

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Lampiran 5 : Kuisoner Penelitian

PENGARUH EDUKASI DENGAN *WHATS APP* TERHADAP HASIL GULA DARAH ACAK DAN *SELFCARE BEHAVIOR* PADA PENDERITA DIABETES MELITUS TIPE 2 DI PUSKESMAS TEGALREJO

Petunjuk pengisian:

1. Bacalah dengan cermat dan teliti bagian pertanyaan dalam kuisoner ini
2. Isilah titik-titik yang tersedia dengan jawaban yang menurut Bapak/Ibu/Sdr Sesuai dengan kondisi anda
3. Pilihlah salah satu jawaban yang menurut bapak/ibu/sdr/sdri paling sesuai dengan kondisi yang anda alami dengan memberikan tanda centang(✓) pada pilihan jawaban yang dipilih

A. Karakteristik Responden

1. No responden : _____
2. Nama lengkap : _____
3. Umur : _____
4. Jenis kelamin : Laki-laki Perempuan
5. Tingkat pendidikan : tidak tamat SD SLTA/Sederajat
 Tamat SD/Sederajat Perguruan Tinggi
 SLTP/Sederajat
6. Pekerjaan : Tidak bekerja Pegawai Swasta
 Buruh TNI/Polri
 Petani PNS
 Pedagang/ Wiraswasta Lain-lain
7. Lama Menderita :bulan/tahun*(coret yang tidak perlu)
8. Komplikasi : Tidak
 Ya,sebutkan
 Katarak
 Gagal ginjal
 Stroke
 Penyakit jantung
 Lain-lain.....
9. Merokok : Tidak
 Ya

A. *Kuisoner Health Literacy*

Petunjuk pengisian kuisoner

1. Dalam range sangat mudah sampai sangat sulit , seberapa mudah anda menilai tentang hal dibawah ini.
2. Berilah tanda centang (√) pada pernyataan dibawah ini sesuai dengan kondisi yang anda alami.

No	Pertanyaan	Sangat sulit	Cukup sulit	Cukup mudah	Sangat mudah
1.	Menemukan informasi tentang perawatan/pengobatan penyakit yang menjadi perhatian anda?				
2.	Mencari tahu dimana mencari tenaga kesehatan ketika anda sakit?				
3.	Memahami apa yang dokter jelaskan kepada anda?				
4.	Memahami instruksi dokter atau apoteker bagaimana cara meminum obat yang diresepkan?				
5.	Menilai kapan anda membutuhkan pendapat dari dokter lain?				
6.	Menggunakan informasi yang diberikan oleh dokter untuk membuat keputusan tentang sakit anda?				
7.	Mematuhi instruksi dari dokter atau apoteker anda?				
8.	Menemukan informasi bagaimana mengatur kesehatan mental misalnya stress atau depresi				
9.	Memahami peringatan tentang kesehatan seperti perilaku merokok, kurang olahraga, terlalu banyak alkohol?				
10.	Memahami mengapa anda membutuhkan deteksi dini penyakit (<i>health screening</i>)?				
11.	Menilai apakah informasi Kesehatan di media dapat dipercaya?				
12.	Memutuskan bagaimana anda dapat melindungi diri sendiri dari penyakit berdasarkan informasi dari media?				
No	Pertanyaan	Sangat sulit	Cukup sulit	Cukup mudah	Sangat mudah
13.	Menemukan informasi tentang aktivitas yang baik untuk Kesehatan mental anda?				

14.	Memahami nasehat tentang kesehatan dari keluarga atau teman?					
15.	Memahami informasi di media tentang bagaimana menjadi lebih sehat?					
16.	Memberi penilaian kegiatan sehari-hari yang mempengaruhi Kesehatan anda					

Diadaptasi dari (Nurjanah, 2015)

B. Kuisioner Aktivitas *Self Care* Diabetes Melitus

Pertanyaan dibawah ini menanyakan mengenai aktivitas perawatan diri yang anda lakukan selama 7 hari terakhir ini untuk penyakit diabetes.

Berilah tanda (√) sesuai dengan jumlah hari yang anda lakukan ;

Pertanyaan	Jumlah Hari							
	0	1	2	3	4	5	6	7
POLA MAKAN								
1. Rata-rata dalam satu bulan terakhir, berapa hari dalam satu minggu Anda merencanakan pola makan/ diet?	0	1	2	3	4	5	6	7
2. Berapa hari dalam tujuh hari terakhir Anda makan buah dan sayuran?	0	1	2	3	4	5	6	7
3. Berapa hari dalam tujuh hari terakhir Anda mengkonsumsi makanan berlemak tinggi (daging sapi, daging kambing, daging babi, makanan cepat saji) atau produk olahan susu (keju, krim, yoghurt, mentega)?	0	1	2	3	4	5	6	7
4. Berapa hari dalam tujuh hari terakhir Anda mengatur pemasukan makanan yang mengandung karbohidrat (nasi, roti, mie, jagung, singkong)?	0	1	2	3	4	5	6	7
5. Berapa hari dalam tujuh hari terakhir Anda mengikuti pola makan yang sehat?	0	1	2	3	4	5	6	7
6. Berapa hari dalam tujuh hari terakhir Anda makan makanan selingan/ cemilan yang mengandung gula (seperti kue, biskuit, coklat, es krim)?	0	1	2	3	4	5	6	7
LATIHAN FISIK (OLAHRAGA)								
7. Berapa hari dalam tujuh hari terakhir Anda melakukan aktivitas fisik (misalnya mencuci, menyapu, mengepel, menjemur) setidaknya selama 30 menit?	0	1	2	3	4	5	6	7

8. Berapa hari dalam tujuh hari terakhir Anda mengikuti sesi latihan khusus (misalnya berenang berjalan, bersepeda) selain dari apa yang Anda lakukan di sekitar rumah atau apa yang menjadi bagian dari pekerjaan Anda?	0	1	2	3	4	5	6	7
PERAWATAN KAKI								
9. Berapa hari dalam tujuh hari terakhir Anda memeriksa kaki Anda?	0	1	2	3	4	5	6	7
10. Berapa hari dalam tujuh hari terakhir Anda memeriksa bagian dalam sepatu Anda?	0	1	2	3	4	5	6	7
11. Berapa hari dalam tujuh hari terakhir Anda mengeringkan sela-sela jari kaki setelah dicuci ?	0	1	2	3	4	5	6	7
12. Berapa hari dalam tujuh hari terakhir Anda menggunakan alas kaki saat keluar rumah?	0	1	2	3	4	5	6	7
13. Berapa hari dalam tujuh hari terakhir Anda menggunakan pelembab atau lotion pada kaki Anda?	0	1	2	3	4	5	6	7
MINUM OBAT								
14. Berapa hari dalam satu minggu terakhir Anda minum obat diabetes yang disarankan untuk Anda?	0	1	2	3	4	5	6	7
15. Apakah Anda menggunakan insulin? Jika Ya, berapa hari dalam tujuh hari terakhir Anda menggunakan insulin yang disarankan untuk Anda?	0	1	2	3	4	5	6	7
MONITORING GULA DARAH								
16. Berapa hari dalam tujuh hari terakhir Anda mengecek gula darah Anda sesuai dengan waktu yang disarankan oleh tenaga kesehatan Anda?	0	1	2	3	4	5	6	7
17. a. Jika Anda menggunakan insulin, berapa hari dalam tujuh hari terakhir Anda mengecek gula darah Anda?	0	1	2	3	4	5	6	7
b. Jika Anda tidak menggunakan insulin. Dalam tiga bulan terakhir, berapa kali Anda mengecek gula darah secara rutin?	0	1	2	3				

<p>Self-care measure</p>	<p>Exercise</p>	<p>eat to lose weight</p>
<p>The Summary of Diabetes Self-Care Activities The questions below ask you about your diabetes self-care activities during the past 7 days. If you were sick during the past 7 days, please think back to the last 7 days that you were not sick.</p>	<p>On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? (Total minutes of continuous activity, including walking).</p>	<p>d. Eat lots of food high in dietary fiber e. Eat lots (at least 5 servings per day) of fruits and vegetables f. Eat very few sweets (for example: desserts, non-diet sodas, candy bars) g. Other (specify):</p>
<p>Diet How many of the last SEVEN DAYS have you followed a healthful eating plan?</p>	<p>0 1 2 3 4 5 6 7 On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?</p>	<p>h. I have not been given any advice about my diet by my health care team.</p>
<p>0 1 2 3 4 5 6 7 On average, over the past month, how many DAYS PER WEEK have you followed your eating plan?</p>	<p>0 1 2 3 4 5 6 7 Blood Sugar Testing On how many of the last SEVEN DAYS did you test your blood sugar?</p>	<p>2A. Which of the following has your health care team (doctor, nurse, dietitian or diabetes educator) advised you to do? Please check all that apply: a. Get low level exercise (such as walking) on a daily basis. b. Exercise continuously for a least 20 minutes at least 3 times a week. c. Fit exercise into your daily routine (for example, take stairs instead of elevators, park a block away and walk, etc.)</p>
<p>0 1 2 3 4 5 6 7 On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?</p>	<p>0 1 2 3 4 5 6 7 On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your health care provider?</p>	<p>d. Engage in a specific amount, type, duration and level of exercise. e. Other (specify): f. I have not been given any advice about exercise by my health care team.</p>
<p>0 1 2 3 4 5 6 7 On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy products?</p>	<p>0 1 2 3 4 5 6 7 Foot Care On how many of the last SEVEN DAYS did you check your feet?</p>	<p>3A. Which of the following has your health care team (doctor, nurse, dietitian, or diabetes educator) advised you to do? Please check all that apply: a. Test your blood sugar using a drop of blood from your finger and a color chart. b. Test your blood sugar using a machine to read the results. c. Test your urine for sugar. d. Other (specify): e. I have not been given any advice either about testing my blood or urine sugar level by my health care team.</p>
<p>0 1 2 3 4 5 6 7</p>	<p>0 1 2 3 4 5 6 7 On how many of the last SEVEN DAYS did you inspect the inside of your shoes?</p>	<p>4A. Which of the following medications for your diabetes has your doctor prescribed? Please check all that apply: a. An insulin shot 1 or 2 times a day. b. An insulin shot 3 or more times a day. c. Diabetes pills to control my blood sugar level. d. Other (specify): e. I have not been prescribed either insulin or pills for my diabetes.</p>
<p>Smoking Have you smoked a cigarette—even one puff—during the past SEVEN DAYS?</p>	<p>0. No 1. Yes. If yes, how many cigarettes did you smoke on an average day? Number of cigarettes: _____</p>	<p>5A. On how many of the last SEVEN DAYS did you space carbohydrates evenly through the day?</p>
<p>Additional Items for the Expanded Version of the Summary of Diabetes Self-Care Activities.</p>	<p>Self-Care Recommendations</p>	<p>Diet</p>
<p>1A. Which of the following has your health care team (doctor, nurse, dietitian, or diabetes educator) advised you to do? Please check all that apply: a. Follow a low-fat eating plan b. Follow a complex carbohydrate diet c. Reduce the number of calories you</p>	<p>eat to lose weight</p>	<p>0 1 2 3 4 5 6 7</p>

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Medications

6A. On how many of the last SEVEN DAYS, did you take your recommended diabetes medication?

0 1 2 3 4 5 6 7

OR

7A. On how many of the last SEVEN DAYS did you take your recommended insulin injections?

0 1 2 3 4 5 6 7

8A. On how many of the last SEVEN DAYS did you take your recommended number of diabetes pills?

0 1 2 3 4 5 6 7

Foot Care

9A. On how many of the last SEVEN DAYS did you wash your feet?

0 1 2 3 4 5 6 7

10A. On how many of the last SEVEN DAYS did you soak your feet?

0 1 2 3 4 5 6 7

11A. On how many of the last SEVEN DAYS did you dry between your toes after washing?

0 1 2 3 4 5 6 7

Smoking

12A. At your last doctor's visit, did anyone ask about your smoking status?

0. No

1. Yes

13A. If you smoke, at your last doctor's visit, did anyone counsel you about stopping smoking or offer to refer you to a stop-smoking program?

0. No

1. Yes

2. Do not smoke.

14A. When did you last smoke a cigarette?
More than two years ago, or never smoked

One to two years ago

Four to twelve months ago

One to three months ago

Within the last month

Today

Scoring Instructions for the Summary of Diabetes Self-Care Activities
Scores are calculated for each of the five

regimen areas assessed by the SDSCA: Diet, Exercise, Blood-Glucose Testing, Foot-Care, and Smoking Status.

Step 1:

For items 1-10, use the number of days per week on a scale of 0-7. Note that this response scale will not allow for direct comparison with the percentages provided in Table 1.

Step 2: Scoring Scales

General Diet = Mean number of days for items 1 and 2.

Specific Diet = Mean number of days for items 3, and 4, reversing item 4 (0-7, 1-6, 2-5, 3-4, 4-3, 5-2, 6-1, 7-0).

Given the low inter-item correlations for this scale, using the individual items is recommended.

Exercise = Mean number of days for items 5 and 6.

Blood-Glucose Testing = Mean number of days for items 7 and 8.

Foot-Care = Mean number of days for items 9 and 10.

Smoking Status = Item 11 (0 = non-smoker, 1 = smoker), and number of cigarettes smoked per day.

Scoring for Additional Items

Recommended regimen = Items 1A - 4A, and items 12A - 14A, no scoring required.

Diet = Use total number of days for item 5A.

Medications = Use item 6A - OR - 7A AND 8A, use total number of days for item 6A, use mean number of days if both 7A and 8A are applicable.

Foot-Care = Mean number of days for items 9A - 11A, after reversing 10A and including items 9 and 10 from the brief version.

HLS Q16
Health care sub-domain 1. To find information about the treatment of your own diseases 2. Get information about where you will get professional help when you are sick 3. To understand what your doctor tells you 4. To understand how your doctor or pharmacist directives how to use a prescribed medicine 5. To evaluate when it may be necessary to get a second doctor's opinion 6. Using your doctor's information to make decisions about your illness 7. Fulfill the instructions of your doctor or pharmacist
Disease prevention sub-domain 8. To find information about the treatment of mental health problems such as stress and depression 9. Be aware of health warnings about behaviors such as smoking, low physical activity and excessive alcohol intake 10. To understand why you need health screening 11. To assess the accuracy of the information on health risks in the media 12. To decide how to protect himself/herself from illnesses according to the information in the media
Health promotion sub-domain 13. Access to information about activities that are good for mental health 14. To understand the advice of the family or friends about health 15. To understand the information about being healthier on the media 16. To assess which of the daily behaviors are health related