

# Adherence to Self-Care Behavior in Patients Diagnosed with Type 2 Diabetes Mellitus in the Outpatient Department of the Philippine General Hospital

Ranhel De Roxas and Nemencio Nicodemus, Jr.

*College of Medicine, University of the Philippines-Philippine General Hospital, Manila*

## Abstract

**Objective.** The objective of this study is to determine the level of adherence of T2DM patients to the recommended self-care behavior: healthy eating, being active, glucose monitoring, medication adherence, problem-solving, healthy coping and risks reduction.

**Methodology.** This is a cross-sectional study consisting of administration of the Behavior Score Instrument among 126 diagnosed T2DM patients in the Outpatient Department of the Philippine General Hospital. Data obtained were encoded and analysed using the Stata 12 program where a corresponding score was given to the answers to every question and the average was stratified by the level of adherence to the recommended self-care behaviors.

**Results and Conclusion.** Majority of the participants have good adherence in five of the seven identified self-care behaviors: medication taking (76.2%), healthy coping (65.9%), healthy eating (50.0%), problem solving (47.6%) and being active (46.0%). In terms of glucose monitoring and risks reduction, 63.5% and 55.6% of the participants have fair adherence respectively. Overall, 43.7% have good compliance to the self-care behaviors while 54.8% and 1.6% have fair and poor compliance respectively.

**Key words:** *Diabetes, self-care, behavior, T2DM, adherence*

## INTRODUCTION

The global burden of Type 2 Diabetes Mellitus (T2DM) is rapidly increasing. Data shows that the prevalence of T2DM for all age-groups will double worldwide to 4.4% in the year 2030, with the highest burden in the Asia-Pacific.<sup>1,2</sup> In the Philippines alone, the prevalence of diabetes was estimated to be 4.8%, afflicting approximately more than three million Filipinos,<sup>3</sup> ranking 8<sup>th</sup> among leading causes of mortality among Filipino adults.<sup>4</sup>

T2DM is a chronic and progressive metabolic disorder characterized by elevated levels of blood glucose. Previously, it was primarily a disease of the elderly but because of changing lifestyles, it now affects even the younger population.<sup>5</sup> It is possible to reverse the effects and complications of T2DM early in its course. Its treatment goals include maintaining the patient's glycosylated hemoglobin (HbA1c) level to less than 7% as recommended by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD).<sup>6,7</sup> Despite developments in the pharmacologic armamentarium for T2DM, self-care behavior remains the cornerstone of treatment.<sup>8</sup> Self-care behavior pertains to various tasks that the patient

performs in order to manage the disease. In 2007, the American Association of Diabetes Educators (AADE) identified seven self-care behaviors proven to have direct impact on T2DM management; these include 1) healthy eating, 2) being active, 3) glucose monitoring, 4) medication adherence, 5) problem solving, 6) healthy coping and 7) risk reduction.<sup>9</sup> Understanding these behaviors may have more influence on improving outcomes in the management of T2DM. T2DM patients need to understand their essential role in the management of their condition and health care providers must help them modify their behavior in order to prevent complications. It is estimated that as many as 80% of T2DM patients have knowledge deficits on how to manage their disease and they are four times more likely to develop complications.<sup>10</sup> A search of the PubMed database did not reveal any published studies about the self-care behavior of Filipino patients.

The general objective of this study is to determine the level of adherence of T2DM patients to self-care recommendations: 1) healthy eating, 2) being active, 3) glucose monitoring, 4) medication adherence, 5) problem-solving, 6) healthy coping and 7) risk reduction. The specific objectives are: 1) to validate a questionnaire that can be used to determine the level of adherence to self-care

behavior of T2DM Filipino patients and 2) to determine the level of adherence to self-care behaviors of T2DM patients in the Outpatient Department of the Philippine General Hospital using a validated questionnaire.

## METHODOLOGY

The AADE defines healthy eating as following an eating plan that includes not eating too much, counting the amount of carbohydrates consumed, not eating too much fat, drinking less alcohol and eating fruits, vegetables, whole grains and beans and other food with high fiber. Being active means the patient engages in jogging, cycling, gardening or walking without stopping for at least 150 minutes over at least three days per week, with no more than two consecutive days without physical activity.<sup>11</sup> Self-monitoring of blood glucose refers to the process of consciously and voluntarily taking a daily reading from a glucose meter, understanding if the blood glucose value is within normal limits and connecting deviant readings to prior behavior like excess eating or intake of medications. Medication adherence refers to the compliance to the medications that have been prescribed by the physician for the treatment of T2DM. Problem solving is defined as the ability of the patient to generate a set of potential strategies for problem resolution. This includes when the patient makes a decision about what to eat or how much to eat, choose which medicines to take or decide to go for a walk. Hence, this means figuring out the problem and finding a way to deal with it. Healthy coping means that the patient tries to find ways to help deal with stress, strong emotions or family situations that can make it hard to manage T2DM affecting quality of life. This pertains to effective risk reduction behaviors such as smoking cessation and regular eye, foot and dental examinations, which maximize health and quality of life.

With the identification of the seven self-care behaviors proven to directly affect T2DM, the AADE developed the Behavior Score Instrument (BSI) to directly measure the patients' behavior and identify priorities for change. The original English version of the BSI consists of 21 core questions – three questions for each of the seven self-care behaviors.

The first question deals with how often the patient practice the recommended behavior within a week, the second question deals with the importance of the behavior to the patient and the third question deals with how sure the patient is doing the recommended behavior. It was designed by AADE to support three main objectives: 1) to examine all areas of diabetes management in patients which is key to their success, 2) to provide the framework for how diabetes education and training are to be addressed in the practice setting and 3) to measure both patient progress and professional practice outcomes.<sup>12</sup> All 21 questions are rated along ordinal scales. The BSI and its scoring system were obtained from AADE and an

informal consent was granted to use it in the study for research purposes only.

### Phase I (Questionnaire Validation)

The BSI was sent to University of the Philippines (UP) Manila – *Sentro ng Wikang Filipino* for translation to the local language. Two other native speakers who do not have knowledge of the original tool were requested to back-translate the Filipino version. Word changes in the questionnaire were done accordingly.

The Filipino version of the BSI was pilot tested on 10 T2DM patients in order to assess the degree to which a respondent's understanding of each item matched the content that it was meant to elicit. Patients were asked to identify instructions which were hard to follow, questions which were difficult to understand and may require rephrasing and the level of difficulty encountered when answering each questions. Majority of the patients indicated that the BSI was not difficult to answer but several changes were made based on the feedback of the patients: 1) some phrases which are difficult to understand were simplified, 2) some statements at the beginning of each domain were rephrased or eliminated, and 3) the BSI format was modified into tabular form.

The modified BSI underwent quantitative validation following pilot testing. A sample of 98 patients were included, each responding to 21 items and achieving 80% power to detect the difference between the coefficient alpha under the null hypothesis of 0.70 and the coefficient alpha under the alternative hypothesis of 0.80 using a two-sided F-test with a significance level of 0.05. Also provided along with the modified BSI was a cover letter explaining the purpose of the study, the researcher's contact information and a written assurance on the confidentiality of the answers. Internal consistency and reproducibility (test-retest reliability) were measured. Internal consistency determines the agreement of several questions to measure a single construct. In the study, it was determined using the Cronbach's alpha within each domain, requiring a value of at least greater than 0.70 for it to be acceptable.<sup>13</sup> Reproducibility was also tested by administering the modified BSI two weeks after through a phone call where questions were read verbatim and the patients were asked to give their answer. Twenty-five of the 98 patients who were not reached through phone call were not included in the study; instead, they were replaced. The differences in response between the first and second administration of the BSI were evaluated. Reproducibility was determined using the Cohen's kappa coefficient.

### Phase II (Questionnaire Administration)

This is a descriptive cross-sectional study. Diagnosed T2DM patients waiting for consultation at the General Medicine Clinic and Endocrinology Clinic were recruited

to the study. Due to foreseen logistics constraints, convenience sampling was utilized. Eligible participants were clinic patients aged 18 years or older with a diagnosis of T2DM in their medical record. Patients were declared ineligible for the study if they are too ill (i.e., patients with >3 major diabetic complications) or cognitively impaired to participate. Major diabetic complications refer to coronary artery disease, peripheral arterial disease, diabetic nephropathy, diabetic neuropathy and diabetic retinopathy.

A total of 126 T2DM patients were included in the study. This sample size was required to determine the level of adherence among the patients assuming that percent adherence in the sample population is  $20\pm 8\%$  with  $\alpha=0.05$  and power at 80. This was based on a study estimating that 80% of T2DM patients have knowledge deficits on how to manage their disease.<sup>10</sup>

Eligible patients waiting in line for consultation at the aforementioned clinics were approached and a description of the study was discussed. Those interested and who gave their consent were then given the modified BSI. They were asked to answer the questionnaire on their own but they were reassured that any questions could be addressed to the researcher immediately. Patients who did not consent to answer the modified BSI were not compelled to join the study.

Data were encoded and analysed using the STATA 12 program. The analysis was stratified by the level of adherence to each of the self-care behaviors. A corresponding score of 1-3 was given to the answers to every question based on the original tool. The average of the scores in every self-behavior domain was computed. An average of 1-1.499 was considered poor adherence, 1.5-2.499 was considered fair adherence and 2.5-3 was considered good adherence in a particular domain. The overall score was computed by getting the mean of the average score in each domain and was interpreted in the same way as in the individual self-care behavior domains.

The details of the study were discussed by the researcher with each of the prospective participants. Eligible patients were not coerced in any way to participate. Patients were only included upon giving consent. The anonymity of participants, as well as the confidentiality of the data obtained, was assured by the researcher. The study was submitted to and was approved by the UP Manila Ethics Review Board (UPMREB-2012-0346-P1).

## RESULTS

### Phase I

A total of 98 patients were included for validation. Majority of the participants were females (61.2%), high school graduates (41.9%), unemployed (66.3%) and take at least two medications for diabetes (41.8%). Validity was

tested based on internal consistency and reproducibility. Internal consistency was measured by measuring the value of Cronbach's alpha in each of the seven self-care behavior domains (Table 1). Majority of the domains had acceptable values of greater than 0.70 except for medication taking (0.694) and risk reduction (0.605). In the medication taking domain, reversed questioning could probably be the reason for the lower Cronbach's alpha value. Instead of being asked how frequently the participants take their medications, they were asked how frequently they missed those medications. In constructs where Cronbach's alpha values are expected to deviate negatively, a value of greater than 0.50 is considered a sign of acceptable internal consistency.<sup>14</sup> Hence, even with the relatively lower Cronbach's alpha value, the researcher opted not to modify the question since reverse questioning also reduces response bias.<sup>15</sup> Similarly, in the risk reduction domain, the questions require recall of events within the year compared to the other domains that only require recall of events within the previous week. Therefore, the questions were not modified as well, even with the low Cronbach's alpha value. The average inter-item correlation measures the correlation between an item and the rest of the questions in each domain requiring values between 0.30-0.70 in order to be acceptable, which means that each of the items measure different entities and are not redundant. The modified BSI revealed a satisfactory overall Cronbach's alpha of 0.861 and an acceptable average inter-item correlation of 0.492. Considering the educational attainment of the participants as well as the high overall Cronbach's alpha, the two domains with relatively lower values were still included in the study questionnaire without any revisions.

**Table 1.** Internal consistency of the seven domains of the BSI questionnaire

	Cronbach's alpha	Average inter-item correlation
Healthy Eating	0.727	0.471
Being Active	0.781	0.544
Monitoring	0.725	0.468
Medication Taking	0.694	0.430
Problem Solving	0.741	0.489
Healthy Coping	0.878	0.705
Risk Reduction	0.605	0.338
Overall	0.861	0.492

\*Cronbach's alpha value greater than 0.70 and an Average Inter-item correlation value within 0.30-0.70 are considered acceptable.

The overall Cohen's kappa coefficient for reproducibility of the BSI was "good" (0.679, 72.79% agreement). Out of the 21 items, five had very good reproducibility (>0.80), nine had good reproducibility (0.60-0.80), six had moderate reproducibility (0.40-0.60) and the rest had fair reproducibility. None of the domains had poor agreement (Table 2). Since the modified BSI was found to have acceptable internal consistency and reproducibility based on the computed Cronbach's alpha and Cohen's kappa coefficient, the actual data collection for the study proceeded without major revisions on the tool.

**Table 2.** Reproducibility (test-retest reliability) of the seven domains of the BSI questionnaire

	Pooled Kappa Value	Agreement (%)
Healthy Eating	0.693	69.75
Being Active	0.628	68.37
Monitoring	0.712	76.19
Medication Taking	0.711	76.87
Problem Solving	0.708	75.85
Healthy Coping	0.694	74.49
Risk Reduction	0.611	68.03
Overall	0.679	72.79

\*Cohen's kappa value: very good reproducibility if greater than 0.80, good reproducibility if values within 0.60-0.80, moderate reproducibility if values within 0.40-0.60, fair reproducibility if values within 0.20-0.40 and poor reproducibility if values less than 0.20.

## Phase II

A total of 126 patients were included in the study. The participants from the validation testing were included. The overall demographic characteristics are summarized in Table 3. Majority of the participants were females (65.1%). This could be explained by the fact that T2DM is more prevalent in Filipino females.<sup>16</sup> The study population distribution according to education and occupation indicated that a high proportion of patients belonged to the lower socioeconomic status, which is expected in a public tertiary hospital. The mean age was  $59.3 \pm 10.1$  years while the mean age of diagnosis was  $50.6 \pm 10.6$  years. In a recent national study, it was found that the mean age of onset of diabetes in Filipinos is  $52.2 \pm 11.3$  years,<sup>17</sup> which is consistent with the present study. Most of the participants reported having only one diabetic complication, the majority involving the eye, strengthening the popular belief that vision loss is the most feared complication of diabetes.<sup>18</sup>

**Table 3.** Baseline characteristics of the Phase II study population

Characteristics	
Age	$59.3 \pm 10.1$ years
Sex	
Males	44 (34.9%)
Females	82 (65.1%)
Education	
Elementary	42 (33.3%)
Highschool	51 (40.5%)
College Undergraduate	22 (17.5%)
College Graduate	11 (8.7%)
Occupation	
Self-employed	18 (14.3%)
Employed	19 (15.1%)
Retired	11 (8.7%)
Not employed	78 (61.9%)
Age when diagnosed with T2DM	$50.6 \pm 10.6$ years
Number of maintenance medications	
1	43 (34.1%)
2	50 (39.7%)
3	33 (26.2%)
Number of Complications	
1	103 (81.7%)
2	18 (14.3%)
3	3 (4.0%)

Eighty-three percent of the participants were found to be compliant to medications with minimal deviations from their regimen. In all other domains, less than 10% of the patients adhere to self-care recommendations daily. Majority of the participants follow healthy coping (64.3%), problem-solving (57.1%), healthy diet (51.6%) and active lifestyle (42.1%) four to six times a week (Table 4).

Monitoring of blood glucose was the least followed recommendation with 75.4% taking their blood glucose level only once to thrice a week. This is probably because 1) only a minority of participants are using insulin, requiring daily glucose monitoring, 2) many of the participants are in the low socioeconomic status, 3) many participants do not own a blood glucose meter and 4) many of the participants are not properly advised by their physician.

**Table 4.** Performance of self-care recommendations

Self-care behaviors	Percentage (%)		
	1-3 days/ week	4-6 days/ week	7 days/ week
Following a healthy eating plan	39.7	51.6	8.7
Performing at least 30 minutes of exercise	49.2	42.1	8.7
Monitoring of blood glucose level	75.4	15.1	9.5
Missing taking the prescribed medications	83.3	15.9	0.8
Making a challenging decision for the condition	38.9	57.1	4.0
Dealing with stress or emotional/family problems	23.0	64.3	12.7

Majority of the patients were able to have blood pressure monitoring (92.1%), lipid profile check (77.8%) and an eye examination (68.3%) within the previous year (Table 5). Eighty-four (66.7%) of the participants were non-smokers contributing to the large proportion of participants who do not smoke at present (88.1%). However, there was note of low compliance to foot care (37.3%), dental care (27.8%) and vaccination (15.9%).

**Table 5.** Performance of risk reduction

Reducing Risks Behaviors	Yes	No
Eye exam	86	68.3%
Foot Care	47	37.3%
Dental care	35	27.8%
Vaccination	20	15.9%
Blood pressure monitoring	116	92.1%
Lipid profile check	98	77.8%
Smoking cessation	111	88.1%

Each domain has a total of 27 points divided into three major questions: frequency of adherence (7 points), importance (10 points) and surety of compliance (10 points). In all domains, the importance of following the recommended behavior received the highest total points (mean =7.38) while frequency has a mean of 3.52 and surety of doing the behavior has a mean of 6.18 (Table 6). These points have their corresponding scores in order to determine the level of adherence.

**Table 6.** Mean scores for the individual self care behavior domains

	Mean Total Score $\pm$ SD	Mean Corresponding Score
Healthy Eating	17.4 $\pm$ 5.0	2.42
Being Active	16.6 $\pm$ 5.4	2.35
Monitoring	14.7 $\pm$ 5.4	2.02
Medication Taking	17.0 $\pm$ 3.7	2.70
Problem Solving	17.1 $\pm$ 4.7	2.43
Healthy Coping	18.2 $\pm$ 5.4	2.56
Reducing Risks	18.6 $\pm$ 3.9	2.36

Majority of the participants have good adherence in five of the seven identified self-care behaviors: medication taking (76.2%), healthy coping (65.9%), healthy eating (50.0%), problem solving (47.6%) and being active (46.0%). In terms of glucose monitoring and risks reduction, 63.5% and 55.6% of the participants have fair adherence respectively. Overall, 43.7% have good compliance to the self-care behaviors while 54.8% and 1.6% have fair and poor compliance respectively (Table 7).

**Table 7.** Patient assessment of the level of adherence to self-care behaviors

	Number	Percentage
Healthy Eating		
Good	63	50.0
Fair	55	43.7
Poor	8	6.3
Being Active		
Good	58	46.0
Fair	53	42.1
Poor	15	11.9
Glucose Monitoring		
Good	26	20.6
Fair	80	63.5
Poor	20	15.9
Medication Taking		
Good	96	76.2
Fair	25	19.8
Poor	5	4.0
Problem Solving		
Good	60	47.6
Fair	58	46.0
Poor	8	6.3
Healthy Coping		
Good	83	65.9
Fair	32	25.4
Poor	11	8.7
Risks Reduction		
Good	52	41.3
Fair	70	55.6
Poor	4	3.2
Overall		
Good	55	43.7
Fair	69	54.8
Poor	2	1.6

\*Good Adherence=2.50-3.00, Fair Adherence=1.50-2.49,

Poor Adherence=1.00-1.49

## DISCUSSION

Half of the participants have good adherence to healthy eating. Most reported not eating too much while consuming more fruits and vegetables. More than half of the patients reported following a healthy eating plan just 4-6 times a week, with some allotting one diet-free day a week. Healthy eating is an integral part of diabetes self-care because it improves blood glucose levels, lipid profile and blood pressure.<sup>19</sup> HbA1c was found to significantly decrease in patients receiving intensive dietary advice compared to those receiving just the standard of care.<sup>20</sup> Hence, adherence to healthy eating, preferably as advised by a physician or a dietitian, should be emphasized to T2DM patients.

Exercise, when done on a regular basis, improves lipid and glycemic control, increases insulin sensitivity and contributes to the maintenance of blood pressure, reducing the risk for T2DM complications. It is also the only intervention found to directly affect cardiorespiratory fitness while reducing the risk for cardiovascular disease.<sup>21</sup> The current study found that majority of T2DM patients

have good adherence to an active lifestyle. But since most of the participants were elderly, the usual form of activity reported was brisk walking. This is contrary to previous studies stating that T2DM patients tend to be less likely to engage in physical activities<sup>22</sup> and that it is an underused therapy in the medical care of T2DM.<sup>23</sup> However, it should be noted that the results of the current study are based on self-report of a non-structured exercise intervention. In a systematic review done by Kavookjian et al.,<sup>11</sup> it is the structured exercise intervention that improves cardiovascular outcomes than non-structured interventions like brisk walking. There is no discrete exercise regimen that can be generalized to T2DM patients since it should be tailored individually according to person's needs, priorities and capabilities.

Self-monitoring of blood glucose is actually a patient-centered control process of consciously and voluntarily managing T2DM which involves not only taking a reading from a glucose meter but also understanding if the blood glucose value is within normal limits, connecting deviant readings from prior behavior like eating or intake of medications, implementing an action plan for blood glucose control and giving less weight to subjective feelings like dizziness. In the current study, majority of the participants were classified as having fair adherence to glucose monitoring (63.5%). The participants find it important to monitor blood glucose levels (mean points=7.0, mean score=2.54) though they are not sure that it would be done (mean points=5.27, mean score=2.04). More than 75% of the participants monitor their blood sugar less than thrice a week. This could be because only about 26.2% of the participants are insulin-requiring necessitating daily monitoring. In a systematic review done by McAndrew et al.,<sup>24</sup> no existing studies support that glucose monitoring improves the control of blood glucose levels among T2DM patients not using insulin. Still, this should not stop patients from self-monitoring their blood glucose levels at key pre-determined times because patients adjusting their treatment and self-care behavior accordingly were found to have improvement in their HbA1c levels by 0.25%.<sup>25,26</sup>

In the current study, results showed good adherence to medication taking (76.2%). Though this is a respectable figure, the results are based on self-reports of patients seeking consult in the outpatient department. In a study done by Mason et al.,<sup>27</sup> there was note of discrepancy in the adherence among T2DM patients taking oral hypoglycemic agents, where 75.4% were adherent based on electronic monitoring compared to 92.4% based on self-report. Since adherence to the treatment medications is a worldwide problem and is primarily related to the simplicity of the regimen, severity of T2DM and the possible consequences of missed doses, patient education and counseling should be emphasized. Specific interventions to improve this behavior still need further studies.<sup>28</sup>

Problem solving is defined as "a learned behavior that includes generating a set of potential strategies for problem resolution, selecting the most appropriate strategy, applying the strategy and evaluating the effectiveness of the strategy."<sup>29</sup> Though problem solving was identified as the most difficult behavior to teach T2DM patients,<sup>30</sup> the current study found that majority of participants have fair to good adherence (93.6%) to problem solving. Many of the participants claim that they are used to the demands of diabetes, making it easy to make decisions. Because of this, the study cannot conclude if the participants effectively solve their problems. In a systematic review, patients receiving group sessions of problem-oriented therapy have decreased HbA1c and total cholesterol levels.<sup>31</sup> In the local setting, further studies to determine correlation between problem solving and blood sugar levels should be undertaken because there is no current standardized tool to assess problem solving in T2DM is available.

Healthy coping is defined as "responding to a psychological and physical challenge by recruiting available resources to increase the probability of favorable outcomes in the future."<sup>32</sup> It is a substantial continuing rather than occasional behavior in T2DM management.<sup>33</sup> Emotional factors such as depression, motivational factors, poor communication and low socioeconomic status compromises adherence.<sup>34</sup> In the current study, there is reported good adherence to healthy coping (65.9%). This can be probably attributed to the strong family ties of Filipinos. Filipinos, being family-centric, tend to cope with illness through the help of family and friends.<sup>35</sup> They typically hold to the idea that ill persons should not live physically and financially apart from their families.<sup>36</sup>

In the current study, it was found that there was poor adherence to foot care, dental care and vaccinations. One potential reason for this is that patients were not educated regarding these preventive measures. Another possibility is that physicians do not provide advice on these practices until patients report symptoms. The current study therefore suggests that more attention be given to these aspects of care.

## CONCLUSION

The current study found that T2DM patients in the Philippine General Hospital have fair adherence to the seven self-care behaviors. This calls for further improvement to maximize their benefits, hence, the following recommendations: 1) T2DM patients should receive intensive dietary advice either from their physician or a dietitian, 2) Structured exercise intervention should be individually tailored for every patient, 3) Patients should be taught how to adjust specific behaviors depending on the blood glucose monitoring, 4) Families of diabetic patients should be involved in the treatment process, 5) Regular foot check-up, dental check-up and regular influenza and pneumococcal vaccinations should be

offered to all T2DM patients, together with yearly eye examination, regular blood pressure and lipid monitoring and smoking cessation, and 6) Efforts to constantly remind and educate patients on the need to consistently adhere to these behaviors to improve diabetes should be observed.

In the modified BSI, it is recommended to remove or modify certain parameters based on the patients' clinical profile. For instance, patients should be classified as those who are insulin-requiring and those who are not. There should be a separate scoring between these two groups especially in the blood glucose monitoring domain. This will make the stratification more accurate.

Further studies are also deemed necessary on the objective methods of measuring certain domains like medication adherence and problem solving. Being able to measure these behaviors objectively may help health care providers better educate T2DM patients.

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# JAFES

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## Appendix

### AADE Behavior Score Dashboard

The following questions are about the things you need to do to stay healthy with your diabetes. These questions ask about the things you do, how often you do them, how important they are to you and how sure you are about doing them.

Please think about what has happened over the past week, or last 7 days, as you answer the following questions.

#### I. Healthy Eating

Following an eating plan that is good for you includes: not eating too much, counting the amount of carbohydrates you eat, not eating too much fat, keeping an eye on/or drinking less alcohol. It also means eating fruits, vegetables, whole grains and beans and other food with high fiber.

Following an eating plan that is good for you may also include reaching goals for losing weight, and limiting the amount of protein and salt you eat.

During the past week, or last 7 days, how many days were you able to follow a healthy eating plan?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How important is it to you to follow an eating plan that is good for you, where 0 is not important at all and 10 is very important?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How sure are you that you can follow an eating plan that is good for you, where 0 is not sure at all and 10 is very sure?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10

#### II. Being Active

Being active means you are taking part in doing things such as jogging, bicycling, gardening or walking without stopping for at least 30 minutes most days of the week.

During the past week, or last 7 days, how many days were you able to be active?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How important is it to you to be active, where 0 is not important at all and 10 is very important?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How sure are you that you can be active, where 0 is not sure at all and 10 is very sure?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10

#### III. Monitoring

Monitoring means that you regularly check blood sugar using a blood glucose meter either on your own or with the help of a family member.

During the past week, or last 7 days, how many days were you able to monitor your sugar at least once per day?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How important is it to you to monitor your sugar at least once per day, where 0 is not important at all and 10 is very important?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How sure are you that can monitor your sugar at least once per day, where 0 is not sure at all and 10 is very sure?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10

#### IV. Taking Medication

Taking medication means that you take medicines that have been prescribed by your healthcare provider to treat your diabetes or other health conditions. These may be pills, insulin, creams or other medicines that you inject. For the next several questions, please answer for all the medicines that you take.

Sometimes, it can be hard to remember to take all of your medicines. During the past week, or last 7 days, how many days have you missed taking your medicines as prescribed?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How important is it to you to take your medicines, where 0 is not important at all and 10 is very important?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How sure are you that you can take your medicines, where 0 is not sure at all and 10 is very sure?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10

#### V. Problem Solving

Problem solving means coming up with ways to make everyday and/or challenging decisions to stay healthy with your diabetes. When you make a decision about what to eat or how much to eat, choose which medicines to take, decide whether to take a walk, or determine how you're going to make changes to your daily routine to help your diabetes, you are problem solving. For most situations this means figuring out the problem, finding a way to deal with it and thinking about what may prevent you from solving the problem.

During the past week, or last 7 days, how many days have you done problem-solving for everyday and/or challenging decisions?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How important is being able to problem-solve when being faced with everyday and/or challenging decisions, where 0 is not important at all and 10 is very important?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How sure are you that you can problem-solve when faced with everyday and/or challenging decisions, where 0 is not sure at all and 10 is very sure?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10

#### VI. Healthy Coping

Healthy coping is having ways to help yourself or knowing when and how to seek help when you are overwhelmed by your diabetes. Every person with diabetes has to deal with stress, strong emotions or family situations that can make it hard to manage their diabetes. How you feel and your quality of life can be affected by emotional and social problems.

During the past week, or last 7 days, how many days were you able to cope in a healthy way when you faced stress, emotional or family problems?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How important is it to you to either help yourself or know when and how to seek help when you are faced with stress, emotional or family problems, where 0 is not important at all and 10 is very important?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How sure are you that you can help yourself or know when and how to seek help when you are faced with stress, emotional or family problems, where 0 is not sure at all and 10 is very sure?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10

#### VII. Reducing Risks

Effective risk reduction behaviors such as smoking cessation, and regular eye, foot and dental examinations reduce diabetes complications and maximize health and quality of life. An important part of self-care is learning to understand, seek and regularly obtain an array of preventive services.

Check the following things that have happened in the past year.	<input type="checkbox"/>									
<input type="checkbox"/> Had an eye exam (with drops in the eye) by an eye doctor										
<input type="checkbox"/> Had feet checked by a health care provider										
<input type="checkbox"/> Saw a dentist										
<input type="checkbox"/> Had a flu and/or pneumonia vaccination										
<input type="checkbox"/> Had blood pressure checked										
<input type="checkbox"/> Had cholesterol and triglycerides checked										
<input type="checkbox"/> Got help to stop smoking (only applicable for smokers)										
How important do you feel it is to do the things listed above to help prevent or reduce problems related to diabetes, where 0 is not important at all and 10 is very important?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10
How sure are you that you can do the things listed above to help prevent or reduce problems related to diabetes, where 0 is not sure at all and 10 is very sure?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10