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IMPROVING DIABETES SELF-MANAGEMENT  
DEVELOPING A PATIENT DECISION AID TO IMPROVE PATIENT EDUCATION

by  
Morgan Paige Baker

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of  
the requirements of the Sally McDonnell Barksdale Honors College.

Oxford  
April 2020

Approved by

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## **ABSTRACT**

### **Improving Diabetes Self-Management Developing a Patient Decision Aid to Improve Patient Education (Under the direction of Dr. Meagen Rosenthal)**

Type 2 diabetes is a complex disease that affects a large population of people. It is imperative that efforts are made to develop more effective and inclusive treatment strategies for patients with this condition. A promising approach being studied is the utilization of community pharmacists to individualize and implement diabetes self-management training and education. The objective of this study is to develop a preliminary version of a patient decision aid (PDA) designed to evaluate patient knowledge and behavior towards diabetes self-management for use in the community pharmacy setting. The study design used to achieve this objective was a cross-sectional survey applying a modified Delphi-procedure. The survey consisted of 59 questions and asked participants to rank the difficulty of each question, to determine whether the item should be included or removed, and to include any additional comments or recommendations for further development of the PDA. It was completed by faculty members at the University of Mississippi School of Pharmacy and practicing community pharmacists throughout the region. Most respondents felt that the proposed questions should be retained, especially after the implementation of the recommended edits given by respondents. It was found that the difficulty rankings were relatively balanced between “Low”, “Medium”, and “High” difficulty; however, it is noted that more “High” difficulty questions should be created in the future in order to assess a broader scope of

the patient's knowledge. Additionally, it was concluded the PDA could become more patient-friendly through the re-wording of questions in future versions of the PDA.

Overall, the assessment of the developed PDA provides the momentum necessary for the further improvement of patients' self-management of diabetes.

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## BACKGROUND

Diabetes mellitus is a well-known and commonly occurring disease characterized by a “deficiency in the secretion or action of insulin<sup>1</sup>.” (1). Type 1 and Type 2 diabetes are the two clinical classes of this disease, and they each correspond to different etiologies. Type 2 diabetes has a gradual disease onset where insulin is unable to effectively create a response within the cell. As a result, individuals with Type 2 diabetes become resistant to insulin; therefore, their cells can no longer respond to and absorb glucose from the blood (1). Some of the major risk factors for this class of diabetes include age, obesity, and physical inactivity; and the complications are intricate and systemic (2).

The number of people diagnosed with diabetes continues to increase. The most recent estimates suggest that roughly 34.2 million people living in the United States are currently diagnosed with diabetes. This represents approximately 10.5% of the population (3). However, this rate varies greatly from state to state, and the highest statistics are reported in the South. Specifically, in Mississippi nearly 14% of adults have been diagnosed with this condition (4). Given that research indicates up to 7.2 million additional people have currently undiagnosed diabetes, and another 84.1 million people are at risk of Type 2 diabetes. These factors emphasize the importance of determining more effective treatment strategies and creating different approaches to help patients manage Type 2 diabetes (5).

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<sup>1</sup> Insulin is a hormone produced that encourages the metabolism of glucose in the body. (1).

Regardless of the intentionality of action, all of these patients manage their Type 2 diabetes at varying levels of effectiveness. Patient self-management plays an essential role in the health of patients with chronic illnesses (such as diabetes) because only the patient is responsible for personal daily actions regarding disease management. Self-management for chronic disease must become an ongoing part of a patient's lifestyle and must involve medical, behavioral, and emotional management (6). It is imperative that all diabetes patients learn proper self-management skills in order to decrease complications (5). The patient-centered nature of diabetes self-management is codified and structured by the National Standards for Diabetes Self-Management, which defines diabetes self-management education and support (DSMES) as a, "process [which] incorporates the needs, goals, and life experiences of the person with diabetes or pre-diabetes ... [to] support informed decision making, self-care behaviors, problem solving, and active collaboration with the health care team to improve ... outcomes ..." (p. 6) (5). Importantly, self-management can be learned by patients and has been demonstrated to improve patient outcomes. Recent systematic reviews show improved clinical, psychosocial, knowledge, self-efficacy, diet, and exercise outcomes for patients who receive DSMES (5, 7-9).

While DSMES is a seemingly adequate resource, it is apparent that most patients lack access to DSMES as fewer than 5% of Medicare beneficiaries utilize their benefits. Additionally, ongoing education is needed annually when complications occur and during transitions of care (5). Previous evaluations of DSMES and patient outcomes have focused on individuals' need to change while correlating with evidence-based

guidelines; however, these evaluations fail to adequately account for the patient's specific needs (8). The singular emphasis on a *patient's* need to change may be responsible for their ultimate inability to integrate specific changes long-term. As a result, the current challenge is to improve individuals' access to DSMES while also ensuring that education is focused on the specific needs and wishes of individual patients.

One approach to enhancing patient specificity and knowledge is the utilization of a variety of healthcare professionals. Among these, community pharmacists are widely regarded as being among the most trustworthy and accessible healthcare professionals (10). Additionally, a recent report from North Carolina revealed that high risk Medicaid patients visited community pharmacies 35 times in 2013 compared to only 3.5 visits to other primary healthcare providers (11). As such, community pharmacists have many more opportunities to engage with patients, especially in rural areas where health services are often limited (12). Furthermore, community pharmacists have established a track record for successfully assisting patients in diabetes management (13). However, these services have yet to be completely integrated into normal pharmacy operations due to issues such as the failure of pharmacy interventions to compensate for the workflow and lack of time of this setting (14). Given this evidence, how can DSMES be effectively delivered while utilizing existing patient counseling mechanisms within community pharmacies?

Patient decision aids (PDAs) are tools used to assist patient decision making, and they accomplish this by facilitating patient-centered discussions and shared

decision making between patients and healthcare providers, such as community pharmacists (15, 16). PDAs have been developed to assist with decisions around diabetes treatment goals, medication choices, and clinical consultation agenda setting (16-18). While some of these instruments have been designed to be completed within the clinical consultation, others have been designed to be completed outside of the consultation in order to use the results to drive future consultation discussions (16, 17). PDAs have also been shown to increase patients' knowledge of their conditions and improve patient expectations of consultations with clinicians (19).

Moreover, reviews of electronic decision support and management tools for patients with diabetes have demonstrated value, and patients can engage with them independently (20, 21). A set of quality guidelines for PDAs have been developed, and studies prioritizing medication choice and treatment options for Type 2 diabetes patients have also been undertaken (15-17). Furthermore, there is evidence to suggest that patients with diabetes are comfortable engaging with a variety of online diabetes management tools (21, 18, 22). On the basis of this literature, the overall goal of this project is to develop an instrument to help patients with Type 2 diabetes identify and prioritize patient-specific DSMES needs that can then be integrated into existing patient counseling mechanisms in the community pharmacy setting.

## **OBJECTIVE**

The objective of this project is to develop a PDA to assess Type 2 diabetes patients' current DSMES knowledge and behavior.

## **METHODS**

### **Study Design**

This study design involves two phases: the development of a PDA instrument using DSMES resources and the assessment of the developed PDA items with a survey using a modified Delphi method procedure. This study has been approved by The University of Mississippi's Institutional Review Board (IRB) under Protocol #19x-283.

### **Instrument Development**

The instrument design was guided by the objectives outlined in Breslin, et al. where the authors created a decision-making aid for diabetes medications. In particular, the Breslin study's decision aid was created to promote facilitated conversation between the clinician and the patient so that treatment could proceed through partnered decision making (16). To achieve the objective of this study and encourage pharmacist-patient partnership, the PDA instrument must discern three levels of information from respondents. First, it must assess respondents' current level of knowledge of diabetes self-management. This is important because most patients who have Type 2 diabetes do not receive formal DSMES training (5, 23). Second, the PDA must evaluate respondents' current behaviors towards diabetes self-management activities. That is determining what activities they are regularly engaging in and those that they are not. Third, it must assess individual respondents' needs and priorities which will then be addressed in the community pharmacist counselling sessions. The 2017 National Standards for Diabetes Self-Management Education and Support was used as the

foundation of current evidence on diabetes self-management and the evaluation of self-management knowledge to develop instrument items for presentation to DSMES experts. Additionally, the 2014 Diabetes Empowerment Education Program was utilized for constructing the PDA questions (22). In particular, a series of choice sets, containing hypothetical options, described by a set of attributes with varying levels, was developed for each of the DSMES core content areas (5, 22). See Table 1 for core content areas.

Table 1: DSMES Core Content Areas

<b>Core Content Areas</b>
Diabetes disease process and treatment
Healthy eating
Physical activity
Monitoring and using patient generated health data
Medication usage
Problem solving
Preventing, detecting and treating acute and chronic complications
Healthy coping with psychosocial issues and concerns

Based on an evaluation of the literature and consideration of respondent burden, several items, each with increasing levels of complexity, were developed to evaluate both knowledge and behavior for every core content area. See Table 2 for an example of a knowledge and behavior attribute for a core content area.

Table 2: Example of PDA Item, Knowledge and Behavior

<b>Core Content Area: Healthy eating</b>	
Knowledge	Behavior
<p><b>Carbohydrates or “carbs” can be found in ALL of the following foods-</b></p> <ul style="list-style-type: none"> <li>a) breads, pastas, fruits, dairy products, and sugary foods like desserts</li> <li>b) leafy greens like lettuce or spinach, broccoli, lean meats like chicken breasts, eggs</li> </ul>	<p><b>Most days of the week ½ of my dinner plate is filled with-</b></p> <ul style="list-style-type: none"> <li>a) non-starchy vegetables such as fresh greens or broccoli</li> <li>b) potatoes, bread, and pasta</li> </ul>

### **Data Collection**

This phase of instrument development was guided by a modified Delphi method. The Delphi method involves validating an instrument with multiple rounds of surveys using a qualitative or quantitative questionnaire. Then, this method utilizes experts to collect opinions or generate a consensus. The survey is different from the normal Delphi method in that it merges two rounds of surveys into one questionnaire. This is accomplished by offering a physical copy of the survey and prompts subjective, written edits and recommendations while also providing ‘tick-box’ style quantitative responses (18). The survey provides essential feedback in order to further develop the PDA for its intended use. An example list of at least two attributes for each level of knowledge and behavior were developed for each of the DSMES core content areas, and a paper survey was created to be completed by DSMES experts. First, DSMES experts were asked to rank the items as being of low, medium, or high difficulty for patients to complete. Second, DSMES experts were asked to choose between “Yes” or “No” to

determine if each item developed for the core content areas should be retained in the PDA. Lastly, there was a space at the end of each core area to add any missing attributes that respondents felt pertinent. Refer to Appendix A for a copy of the original PDA instrument circulated to DSMES experts for review and consideration.

### **Sample**

The term DSMES experts is defined as those who are actively engaging in providing patient-centered and tailored diabetes education to patients. Participants were recruited by contacting community pharmacists in various parts of Mississippi and faculty at the University of Mississippi School of Pharmacy. Additional participants were obtained through a snow-ball sampling approach.

### **Analysis**

Based on the data collected, there were two levels of analysis necessary to evaluate the feedback from the DSMES experts. These surveys were assigned an identifying number and responses to each of the questions and parts of the survey were entered into SPSS® Statistics Software (Version 26) for data analysis. Frequencies were tabulated for both respondents' ranking of "Low", "Medium", or "High" difficulty for each PDA item and the number of "Yes" and "No" decisions to assess whether or not to retain each PDA item. There were some surveys in which the respondents did not circle any answer; therefore, their answer was marked as "No response." This quantitative analysis represents the development of a consensus for the retainment and ranking of

attributes as described in the Delphi procedures (18). The PDA item's difficulty rank and retainment is identified as the level chosen by more than the majority (at least 50%) of respondents. A qualitative analysis of respondents' comments and recommendations was performed to better understand these recommendations and to ultimately integrate them into the next version of the PDA. These qualitative changes were grouped based on the characteristics of the edits (18, 24).

## RESULTS

Among the 23 surveys distributed, there were 11 participants who returned surveys with completed responses. Of the 11 returned surveys, 9 were practicing pharmacists and 2 were faculty members at the University of Mississippi School of Pharmacy. These pharmacists were from northern Mississippi or Alabama.

### Question Difficulty Rankings

Table 3 outlines the total number questions for each content area rated at each level of difficulty. While some items displayed varied scores of levels of difficulty for each question, the data was generally consistent and well-ranked throughout each core content area. It was not possible to determine the level of difficulty for 9 questions across 7 core content areas. For those questions that seemed to have a divided score, a decision about the difficulty level of the question will be made based on the assessment of the written recommendations and guided by previous literature. The remaining tables (Tables 4a – 4h) below represent the frequency of scored difficulty ranking responses for each of the core content areas.

Table 3. Total Numbers of Difficulty Questions by Core Content Area

Core Content Area	Low Difficulty	Medium Difficulty	High Difficulty	Unable to determine ranking
Diabetes disease process and treatment	3	2	0	1
Healthy eating	5	3	0	1

Physical activity	3	2	0	1
Monitoring and using patient generated health data	6	0	0	1
Medication usage	4	2	1	1
Problem solving	2	3	0	2
Preventing, detecting, and treating acute and chronic complications	4	3	1	0
Healthy coping with psychosocial issues and concerns	4	2	0	2
<b>Totals:</b>	<b>31</b>	<b>17</b>	<b>2</b>	<b>9</b>

Table 4a. Difficulty Levels for “Diabetes disease process and treatment” Questions

Question	Low Difficulty	Medium Difficulty	High Difficulty	No response
<b>Diabetes disease process and treatment</b>				
High blood glucose is _____ for the body and leads to a _____ in flow of oxygen and blood to the rest of the body.	3	7	1	0
Diabetes can affect which	2	4	5	0

part(s) of the body?				
Hemoglobin A1C Test measures-	0	7	4	0
I usually spend what fraction of my day managing my diabetes?	8	1	1	1
I manage my diabetes-	6	2	2	1
I have been diagnosed with diabetes and generally know what is happening to my body when I am experiencing high or low glucose levels.	6	4	1	0

Table 4b. Difficulty Levels for “Healthy eating” Questions

Question	Low Difficulty	Medium Difficulty	High Difficulty	No response
<b>Healthy eating</b>				
Carbohydrates or “carbs” can be found in ALL of the following foods-	1	9	1	0
Which of the following fats and oils are essential to the body and must be consumed in small quantities?	0	7	4	0
While reading a nutritional	3	5	3	0

label, if a serving provides greater than 20% of the recommended daily value, that food item is _____ in that nutrient-				
The recommended method for cooking meat is-	7	4	0	0
When choosing a healthier meal plan, it is often recommended to-	3	6	1	1
I usually drink milk with ____% fat content	11	0	0	0
Most days of the week ½ of my dinner plate is filled with-	6	3	2	0
When interpreting nutritional information on a food label, I-	8	1	2	0
When choosing a protein for dinner, the majority of the time I eat-	8	2	1	0

Table 4c. Difficulty Levels for “Physical activity” Questions

Question	Low Difficulty	Medium Difficulty	High Difficulty	No response
<b>Physical activity</b>				
Exercise does	4	6	1	0

ALL of the following for the body-				
Participating in physical activity usually _____ blood glucose levels.	2	8	1	0
When your blood glucose levels are low (below 100 mg/dl), exercising may put you at risk for-	3	4	4	0
I exercise (definition: physical activity that follows a plan or schedule) generally-	10	1	0	0
Physical activity is known as any movement that results in burning calories (like walking up stairs, gardening, or doing housework). I usually participate in physical activity-	10	1	0	0
If exercising, I check my blood glucose levels	7	3	1	0

Table 4d. Difficulty Levels for “Monitoring and using patient generated health data” Questions

Question	Low Difficulty	Medium Difficulty	High Difficulty	No response
<b>Monitoring and using patient generated health data</b>				
Why is self-monitoring diabetes important?	5	3	3	0
The two most important tests that you can accomplish at home to successfully manage your diabetes are-	3	5	2	1
A food diary is important because...	6	4	1	0
Do you currently have a food diary or app that helps keep track of your daily eating habits?	7	3	1	0
Have you ever had experience with viewing online test results?	8	3	0	0
Do you track your glucose levels?	8	1	2	0
Are you confident in your ability to test your own glucose levels using a glucose meter?	8	1	2	0

Table 4e. Difficulty Levels for “Medication usage” Questions

Question	Low Difficulty	Medium Difficulty	High Difficulty	No response
<b>Medication usage</b>				
Why do we take medications for diabetes?	7	3	0	1
Diabetes medications do all of the following-	0	5	6	0
Insulin is presented to the body by-	3	3	5	0
A dose of insulin is given according to-	0	8	3	0
Insulin needs to be injected-	3	6	2	0
I keep track of my medications by-	8	2	1	0
When prescribed a medication, I usually-	7	3	1	0
I take my daily medication(s)-	7	3	1	0

Table 4f. Difficulty Levels for “Problem solving” Questions

Question	Low Difficulty	Medium Difficulty	High Difficulty	No response
<b>Problem solving</b>				
What are some activities that can cause you to experience low glucose problems?	0	9	1	1

What are the best ways to prevent diabetes complications and reduce risk in the future?	0	5	5	1
Hypoglycemia is a common diabetes complication where you have _____ glucose levels, and a plan of action must be taken in order to solve the problem.	1	4	5	1
When encountered with a problem managing your diabetes-	9	1	1	0
Think about how the following situation may affect you: You get the flu and notice that your blood glucose levels are higher than normal. What do you do?	2	7	2	0
Think about how the following situation may affect you: You are on vacation at a hotel, and do not have regular access	9	1	1	0

to the gym. What do you do?				
Think about how the following situation may affect you: You go to a new restaurant and are unaware of some healthy meal options. What do you do?	2	6	3	0

Table 4g. Difficulty Levels for “Preventing, detecting, and treating acute and chronic complications” Questions

Question	Low Difficulty	Medium Difficulty	High Difficulty	No response
<b>Preventing, detecting, and treating acute and chronic complications</b>				
Hypertension is the term for blood pressure greater than or equal to ___/___ mm Hg	1	6	4	0
Low doses of which over the counter drug helps prevent heart attacks?	2	9	0	0
People with diabetes and blood pressure above ___/___ mm Hg are at a higher risk for cardiovascular, kidney, and eye complications	0	7	4	0
ALL of the following activities can	5	3	3	0

help lower high blood pressure-				
About what percentage of people with diabetes have high blood pressure?	2	2	7	0
How often do you communicate with a diabetes educator or your healthcare professional?	6	2	3	0
Do you get a flu shot every year?	7	2	2	0
Do you currently smoke or have you ever smoked?	8	1	2	0

Table 4h. Difficulty Levels for “Healthy coping with psychosocial issues and concerns” Questions

Question	Low Difficulty	Medium Difficulty	High Difficulty	No response
<b>Healthy coping with psychosocial issues and concerns</b>				
Negative emotions have which of the following impacts on the body?	3	6	2	0
The best way to cope with disease is to-	6	3	2	0

Does stress increase or decrease blood glucose levels?	2	5	4	0
When assessing the emotional impact of diabetes in my life, I usually have _____ feelings.	1	5	5	0
My chosen coping mechanism(s) to deal with the effect of stress on my mind and body are-	4	6	1	0
My attitude towards my disease treatment tends to be-	6	2	2	1
When diagnosed with diabetes, I reacted-	6	4	1	0
When I think about the complications of the impact of diabetes on my life, I generally-	7	3	1	0

**“Retain” Exemplar Questions**

Table 5 outlines the total number of questions for each content area rated as being retained or not. Generally, it was found that most agreed to keep the questions presented in the PDA. It was not possible to determine whether or not to retain 5 questions across 3 core content areas. In some instances, “Yes” was chosen for an item if the written edits by the respondent were considered. For the attributes that had split results, there will be a reassessment of the item for clarity and validity based on the assessment of the written recommendations and guided by previous literature. The remaining tables (Tables 6a – 6h) below represent the frequency of retain (“Yes”) or do not retain (“No”) responses for each of the core content areas.

Table 5. Total Numbers of Retainment by Core Content Area

Core Content areas	Retain	Do not retain	Unable to determine
Diabetes disease process and treatment	6	0	0
Healthy eating	6	0	3
Physical activity	5	0	1
Monitoring and using patient generated health data	7	0	0
Medication usage	7	0	0
Problem solving	6	0	1
Preventing, detecting, and treating acute and chronic complications	8	0	0
Healthy coping with psychosocial issues and concerns	8	0	0
<b>Totals:</b>	<b>53</b>	<b>0</b>	<b>5</b>

Table 6a. Retainment of “Diabetes disease process and treatment” Questions

Question	YES	NO	No Response
<b>Diabetes disease process and treatment</b>			
High blood glucose is _____ for the body and leads to a _____ in flow of	9	2	0

oxygen and blood to the rest of the body.			
Diabetes can affect which part(s) of the body?	9	2	0
Hemoglobin A1C Test measures-	11	0	0
I usually spend what fraction of my day managing my diabetes?	10	0	1
I manage my diabetes-	9	1	1
I have been diagnosed with diabetes and generally know what is happening to my body when I am experiencing high or low glucose levels.	10	0	1

Table 6b. Retainment of “Healthy eating” Questions

Question	YES	NO	No Response
<b>Healthy eating</b>			
Carbohydrates or “carbs” can be found in ALL of the following foods-	9	0	2
Which of the following fats and oils are essential to the body and must be consumed in small quantities?	5	4	2
While reading a nutritional label, if a serving provides greater than 20% of the recommended daily value, that food item is _____	5	4	2

in that nutrient-			
The recommended method for cooking meat is-	8	1	2
When choosing a healthier meal plan, it is often recommended to-	7	2	2
I usually drink milk with ___% fat content	5	5	1
Most days of the week ½ of my dinner plate is filled with-	9	0	2
When interpreting nutritional information on a food label, I-	9	0	2
When choosing a protein for dinner, the majority of the time I eat-	8	0	3

Table 6c. Retainment of “Physical activity” Questions

Question	YES	NO	No Response
<b>Physical activity</b>			
Exercise does ALL of the following for the body-	9	0	2
Participating in physical activity usually _____ blood glucose levels.	10	0	1
When your blood glucose levels are low (below 100 mg/dl), exercising may put you at risk for-	5	4	2
I exercise (definition: physical	10	0	1

activity that follows a plan or schedule) generally-			
Physical activity is known as any movement that results in burning calories (like walking up stairs, gardening, or doing housework). I usually participate in physical activity-	10	0	1
If exercising, I check my blood glucose levels	7	2	2

Table 6d. Retainment of “Monitoring and using patient generated health data” Questions

Question	YES	NO	No Response
<b>Monitoring and using patient generated health data</b>			
Why is self-monitoring diabetes important?	8	1	2
The two most important tests that you can accomplish at home to successfully manage your diabetes are-	9	1	1
A food diary is important because...	9	0	2
Do you currently have a food diary or app that helps keep track of your daily eating habits?	9	0	2
Have you ever had experience with viewing online test results?	7	2	2
Do you track your glucose levels?	10	0	1

Are you confident in your ability to test your own glucose levels using a glucose meter?	10	0	1
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Table 6e. Retainment of “Medication usage” Questions

Question	YES	NO	No Response
<b>Medication usage</b>			
Why do we take medications for diabetes?	9	0	2
Diabetes medications do all of the following-	9	1	1
Insulin is presented to the body by-	7	2	2
A dose of insulin is given according to-	8	2	1
Insulin needs to be injected-	10	0	1
I keep track of my medications by-	8	1	2
When prescribed a medication, I usually-	9	0	2
I take my daily medication(s)-	10	0	1

Table 6f. Retainment of “Problem solving” Questions

Question	YES	NO	No Response
<b>Problem solving</b>			
What are some activities that can cause you to experience low glucose problems?	9	1	1
What are the best ways to prevent diabetes complications and reduce risk in the future?	9	1	1
Hypoglycemia is a	10	0	1

common diabetes complication where you have _____ glucose levels, and a plan of action must be taken in order to solve the problem.			
When encountered with a problem managing your diabetes-	7	2	2
Think about how the following situation may affect you: You get the flu and notice that your blood glucose levels are higher than normal. What do you do?	9	0	2
Think about how the following situation may affect you: You are on vacation at a hotel, and do not have regular access to the gym. What do you do?	5	4	2
Think about how the following situation may affect you: You go to a new restaurant and are unaware of some healthy meal options. What do you do?	8	1	2

Table 6g. Retainment of “Preventing, detecting, and treating acute and chronic complications” Questions

Question	YES	NO	No Response
<b>Preventing, detecting, and treating acute and chronic complications</b>			

Hypertension is the term for blood pressure greater than or equal to ___/___ mm Hg	9	0	2
Low doses of which over the counter drug helps prevent heart attacks?	5	3	3
People with diabetes and blood pressure above ___/___ mm Hg are at a higher risk for cardiovascular, kidney, and eye complications	7	2	2
ALL of the following activities can help lower high blood pressure-	8	2	1
About what percentage of people with diabetes have high blood pressure?	6	3	2
How often do you communicate with a diabetes educator or your healthcare professional?	9	0	2
Do you get a flu shot every year?	10	0	1
Do you currently smoke or have you ever smoked?	10	0	1

Table 6h. Retainment of “Healthy coping with psychosocial issues and concerns”  
Questions

Question	YES	NO	No Response
<b>Healthy coping with psychosocial issues and concerns</b>			
Negative emotions have which of the following impacts	8	1	2

on the body?			
The best way to cope with disease is to-	9	0	2
Does stress increase or decrease blood glucose levels?	7	2	2
When assessing the emotional impact of diabetes in my life, I usually have _____ feelings.	7	3	1
My chosen coping mechanism(s) to deal with the effect of stress on my mind and body are-	7	2	2
My attitude towards my disease treatment tends to be-	8	2	1
When diagnosed with diabetes, I reacted-	7	3	1
When I think about the complications of the impact of diabetes on my life, I generally-	8	2	1

### Qualitative Content from Surveys

Respondents from 6 of the 11 surveys provided extensive written recommendations for the PDA. There were three main types of edits across the responses: additions, grammatical suggestions, and content clarifications. Beginning with the attribute additions, for the 'Diabetes disease process and treatment' content section, Survey 7 recommended "adding a question regarding diabetic neuropathy and its effects on the legs and feet" (Survey 7). Another survey included a set of attributes in the content area 'monitoring and using patient generated health data.' The respondent wrote the following item, "Do your home glucose measures match with results of Hemoglobin A1C- i.e., are home results accurate?" and also included, "When was the last time you checked the expiration date on [your] glucose strips, control solution and how often do you use [the] control solution to test [your] meter?" (Survey 11).

With respect to 'Medication use,' a respondent said to "consider a comfort with current diabetes regimen" question. In 'Preventing, detecting, and treating acute and chronic complications,' Survey 1 also mentioned to "consider adding lipids and introducing metabolic syndrome." The only suggestion of an additional attribute within the 'Problem solving' content area was from Survey 11, and it stated, "Have you been given a plan of action for hypoglycemia?"

The grammatical suggestions were generally minor word additions, tense changes, and spelling corrections that will be implemented in the new version of the PDA. These types of suggestions were provided mostly by respondents from Surveys 2, 5, and 6. Some examples of these include changing, "keeping them in my cabinet or in my purse and often forget[ting] to take them", to "keeping them in my cabinet or in my

purse and often *forgetting* to take them” for an answer choice under the ‘Medication use’ content area (Survey 2). Another suggestion was to change “I... spend what fraction of my day...” to “I... spend what *amount* of my day...” in order to simplify a question under the ‘Diabetes and disease process and treatment’ content area (Survey 5). Another respondent found that the word “desserts” was misspelled under the ‘Healthy eating’ content area (Survey 6).

Most content clarifications and corrections were added sporadically across the surveys. However, there was one question that was similarly marked by multiple respondents. Within the ‘Physical activity’ core content section, a question assessing the patient’s knowledge about exercising with low blood glucose levels was marked as being miswritten or contradictory to patients in Surveys 1, 2, 5, and 11. A written acknowledgement of this is found in Survey 5, where the respondent changes the correct answer choice to “hypoglycemia” instead of the originally written “hyperglycemia” (Survey 5). Additionally, throughout Survey 2, there were remarks about making the questions “all personalized” and “patient-specific” because some questions were “too scientific” or “too hard for [patients]” (Survey 2). In general, most of the content clarification suggestions included rewording phrases, changing the answer choices, or checking the facts of the statements. While there was not a specific pattern to these suggestions, each edit was considered and none were contradicting.

## DISCUSSION

The objective of this project was to evaluate the initial design of a PDA to ultimately evaluate the knowledge and practices of patients with Type 2 diabetes in a community pharmacy setting. With this in mind, the utilization of the DSMES experts to establish the clarity and face-validity of exemplar questions was essential before they could be tested with patients. The analysis of the survey findings, starting with the difficulty rankings, determined that there is a need for a broader range of item complexities, and DSMES experts verified that most of the items should be retained. The most important findings from this project were that the majority of the respondents scored the PDA items as being “Low” difficulty, yet most of the questions were chosen to be retained. Additionally, the qualitative content of the surveys revealed the presence of various additions, grammatical suggestions, and content clarifications that have potential relevance for the next version of the PDA. In terms of other survey remarks, most of the recommendations or edits were determined to be relevant and will be integrated into the next version of the PDA to enhance the patient’s experience.

### **Analysis of Difficulty Rankings**

The intended aim for the PDA was to have a range of questions of varying low, medium, and high difficulties for each of the core content areas for patients to complete. This ensures that an assessment can be made of the patient’s current level of knowledge and behavior. For the core content areas “Medication usage” and “Preventing, detecting, and treating acute and chronic complications,” all three difficulty

rankings were scored and presented in the survey responses. This suggests that the questions were balanced and accomplished the intended goals. The remaining core content sections (“Diabetes disease process and treatment,” “Healthy eating,” “Physical activity,” “Monitoring and using patient generated health data,” “Problem solving,” and “Healthy coping with psychosocial issues and concerns”) only presented 'Low', 'Medium', and “Medium/High” survey responses. While some scores were split between medium and high, the majority of responses fell towards the 'Medium' difficulty ranking. This data suggests that these sets of questions may not provide enough breadth for the PDA to be able to assess the patient’s knowledge and behavior comprehensively. Additional questions may need to be developed that can be clearly considered 'High' difficulty by DSMES experts in these core content areas.

Possible rationales for the specific difficulty rankings offered by respondents can be gleaned from the qualitative data. For the items with higher difficulty rankings, one can conclude that these questions may have been written in a way that is hard to interpret. To clarify, it is important that only the content itself is difficult and not the patient’s ability to understand the question. A respondent wrote, “Make these [questions] all personalized, [they are] too scientific” when referring to a few different questions throughout multiple content areas (Survey 2). Additionally, another respondent mentions, “reword question” where they ranked a ‘High’ difficulty question (Survey 6). It can be determined that the lower ranked attributes were generally easy to understand the questions’ intentions while also suggesting that the attributes could cause further conversations about a particular content area.

## Reasons for Retaining Items

For the retainment of PDA questions, all of the questions in the content areas “Diabetes disease process and treatment,” “Monitoring and using patient generated health data,” “Medication usage,” “Preventing, detecting, and treating acute and chronic complications,” and “Healthy coping with psychosocial issues and concerns” were retained. It is important to note that some of these ‘Yes’ responses were chosen only if the respondent’s minor suggestions changes were also implemented, which will occur in the creation of the next version of PDA. These results are promising for the PDA development because it supports the DSMES experts’ verification of the value of adding these questions.

For the other content sections (“Healthy eating,” “Physical activity,” and “Problem solving”), there were a few attributes that had split (5- Yes, 4- No) responses, but the majority voted towards retaining the questions. The questions that had more ‘No’ responses should be revisited for clarity and validity because they did not attain the 50% response rate for retainment. An example of this type of question is found in the “Healthy eating” content area and asks, “Which of the following fats and oils are essential to the body and must be consumed in small quantities?” Since this question had a split (5- Yes, 4- No) response, it will be changed to “Which of the following fats and oils are considered healthy?” in order to simplify the question. Only one item had a legitimate split, and it was a question within the “Healthy eating” section assessing the fat content of milk the patient generally consumes. Concerning this item, one respondent wrote, “Is this personal or patient-specific or supposed to assess

[knowledge]?” (Survey 2). This particular question was also unanimously ranked as a ‘Low’ level of difficulty ranking question. Since this question proposed multiple points of confusion, and because there were multiple questions within this content area that also fell into the ‘Low’ ranking, it will not be retained.

### **Other Survey Remarks and Intended Changes**

There were a few additional alterations to the PDA items that will be made to the next version of this PDA involving the “patient friendliness” of exemplar items. In some questions, respondents wrote statements such as “insulting question,” “not a fun question,” and “[Make this] patient-specific” beside exemplar items, which suggests that the comfortability of the attributes need to be revisited (Survey 6, Survey 2).

Subsequently, new options for some items were developed based on DSMES expert recommendations. In particular, a few respondents mentioned including items that assess diabetic neuropathy and circulation in the patients’ feet, as well as home effective glucose monitoring and maintenance of monitoring equipment (Survey 5, 7, and 11). The inclusion of questions about diabetic neuropathy could provide additional benefits because this is a common complication for many patients who have Type 2 diabetes (2). Additionally, self-monitoring glucose levels while also managing the necessary equipment is an essential part of self-management for most patients; therefore, questions assessing their confidence in this topic can develop information that may improve a patient’s experience (25).

## **Limitations**

There are a number of limitations that must be considered when interpreting the results of this study. The sample size of this study, as well as the limited demographics of the DSMES experts involved, should be considered when interpreting the findings from this study. In order to create a more accurate and beneficial instrument, a broader population of DSMES experts should be included in future evaluations. Additionally, the survey items were created utilizing DSMES resources. However, when considering the addition of new items recommended by respondents it will be important to review them using existing literature to ensure that the PDA assesses as many aspects of Type 2 diabetes as possible.

## **Implications**

The results of this study will be used in the development of a new version of the PDA to allow it to be more patient-friendly as well as relevant to current issues involving Type 2 diabetes. With the increasing drive in healthcare towards personalized medicine, this study also aims to create a PDA to target the needs of a specific patient rather than blanketing them in diabetes self-management information that may not be important to them individually (16, 26). With the inclusion of the proposed edits, as well as creating additional questions based on respondents' recommendation, the next step for the evaluation of this PDA will be to provide the opportunity for patients to provide insight on the instrument. Refer to Appendix B for a copy of the updated PDA that includes the relevant changes based on the results from this study. This trial will implement new

ideas as well as generate more momentum for this PDA to reach the community pharmacy setting.

## CONCLUSION

While current DSMES resources struggle with assessing patient-specific needs and providing accessible services, this study aids this situation by proposing a new PDA that can be used to not only improve access to DSMES, while also promoting the utilization of the community pharmacist. This exploratory study soliciting feedback from DSMES experts found that most of the PDA questions should be retained, and the difficulty rankings for the majority of the questions were consistent among participants and determined effectively. Additionally, these respondents provided essential recommended edits for future versions of the PDA. The findings of this project can be used to further develop this PDA for its intended use in community pharmacies.

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## APPENDIX A

Below is the entire survey distributed to DSMES experts for completion.

Hello,

My name is Morgan Baker. You are receiving this letter to participate in the development of a patient decision aid (PDA) because of your expertise in diabetes self-management education and support (DSMES). The PDA will help patients who have diabetes better understand the areas of diabetes self-management with which they need additional assistance. This will represent my honors thesis project for the Sally McDonnell Barksdale Honors College.

In the attached survey, you will be asked to complete three tasks. First, based on the list of questions provided, rank the items as being of low, medium, or high difficulty for patients to complete. Second, you will circle "Yes or No" on the right column to determine if the list of exemplar items should be retained in the PDA based on each of the DSMES content areas. Third, there will be a space at the end of each area to add any missing attributes you feel will be pertinent for each DSMES content area.

Please contact me, Miss Morgan Baker ([mpbaker1@go.olemiss.edu](mailto:mpbaker1@go.olemiss.edu)) if you have any additional questions.

As a reminder, this study has been approved by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or [irb@olemiss.edu](mailto:irb@olemiss.edu).

Thank you very much for your time.

**Instructions for Healthcare Provider**

**STEP 1:** Based on the list of questions provided, rank the items as being of low, medium, or high difficulty for patients to complete.

**STEP 2:** Circle “Yes or No” on the right column to determine if the list of exemplar items should be retained in the PDA based on each of the DSMES content areas.

**STEP 3:** Third, there will be a space at the end of each area to add any missing attributes you feel will be pertinent for each DSMES content area.

**Patient Instructions**

The following questions assess your understanding of Diabetes disease process and treatment. Please choose the best possible answer, or the answer that best describes your experience.

<u>(1) Diabetes disease process and treatment</u>	<b>STEP 1:</b> (circle one)	<b>STEP 2:</b> (circle one)
<p><b>High blood glucose is _____ for the body and leads to a _____ in flow of oxygen and blood to the rest of the body.</b></p> <p>a) harmful; decrease b) helpful; increase</p>	Low Medium High	YES or NO
<p><b>Diabetes can affect which part(s) of the body?</b></p> <p>a) Pancreas only b) Nerves, Kidneys, Cardiovascular System</p>	Low Medium High	YES or NO
<p><b>Hemoglobin A1C Test measures-</b></p> <p>a) the average level of glucose in the blood in the past three months b) the level of glucose after consuming sugar over a period of 5-6 hours.</p>	Low Medium High	YES or NO
<p><b>I usually spend what fraction of my day managing my diabetes?</b></p> <p>a) Not much time b) Regularly and often</p>	Low Medium High	YES or NO
<p><b>I manage my diabetes-</b></p> <p>a) well- I have planned and regular medication regimens, etc. b) not well- I struggle to manage my blood glucose levels.</p>	Low Medium High	YES or NO
<p><b>I have been diagnosed with diabetes and generally know what is happening to my body when I am experiencing high or low glucose levels.</b></p> <p>a) Yes b) No</p>	Low Medium High	YES or NO
<p><b>STEP 3:</b></p> <p>In the space provided, please add and rank any additional attributes you feel is necessary regarding Diabetes disease process and treatment.</p>		

**Patient Instructions**

The following questions assess your understanding of healthy eating habits. Please choose the best possible answer or the answer that best describes your experience.

(2) Healthy eating	STEP 1: (circle one)	STEP 2: (circle one)
<p><b>Carbohydrates or “carbs” can be found in ALL of the following foods-</b> Choice group 1: breads, pastas, fruits, dairy products, and sugary foods like deserts Choice group 2: leafy greens like lettuce or spinach, broccoli, lean meats like chicken breasts, eggs</p>	Low Medium High	YES or NO
<p><b>Which of the following fats and oils are essential to the body and must be consumed in small quantities?</b> a) olive oil, canola oil, fish oil b) coconut oil, palm oil, animal fats</p>	Low Medium High	YES or NO
<p><b>While reading a nutritional label, if a serving provides greater than 20% of the recommended daily value, that food item is _____ in that nutrient-</b> a) High b) Low</p>	Low Medium High	YES or NO
<p><b>The recommended method for cooking meat is-</b> a) roasting, boiling, grilling b) frying and sautéing</p>	Low Medium High	YES or NO
<p><b>When choosing a healthier meal plan, it is often recommended to-</b> a) increase variety of the foods you eat b) decrease variety and only eat fruits and vegetables</p>	Low Medium High	YES or NO
<p><b>I usually drink milk with ____% fat content</b> a) skim or 1% b) 2% or whole</p>	Low Medium High	YES or NO
<p><b>Most days of the week ½ of my dinner plate is filled with-</b> a) non-starchy vegetables such as fresh greens or broccoli b) potatoes, bread, and pasta</p>	Low Medium High	YES or NO
<p><b>When interpreting nutritional information on a food label, I-</b> a) Use the recommended servings of food on my meals based on the content on the label</p>	Low Medium High	YES or NO

b) Disregard the content on the label and eat as much as I want		
<b>When choosing a protein for dinner, the majority of the time I eat-</b> a) beef, deli meats, pork, ham b) chicken, turkey, fish	Low Medium High	YES or NO
<b>STEP 3:</b> In the space provided, please add and rank any additional attributes you feel is necessary regarding healthy eating.		

**Patient Instructions**

The following questions assess your understanding of physical activity. Please choose the best possible answer or the answer that best describes your experience.

(3) Physical activity	STEP 1: (circle one)	STEP 2: (circle one)
<b>Exercise does ALL of the following for the body-</b> a) raises blood pressure, weakens the heart due to strain, stretches muscles b) reduces blood glucose levels and the amount of insulin needed to control those levels, reduces pain and leg cramps, improves moods	Low Medium High	YES or NO
<b>Participating in physical activity usually _____ blood glucose levels.</b> a) Lowers b) Raises	Low Medium High	YES or NO
<b>When your blood glucose levels are low (below 100 mg/dl), exercising may put you at risk for-</b> a) Hyperglycemia b) No risk, it is healthy to participate in exercise with high blood sugar	Low Medium High	YES or NO
<b>I exercise (definition: physical activity that follows a plan or schedule) generally-</b> a) Once a week or less b) Twice a week or more	Low Medium High	YES or NO

<p><b>Physical activity is known as any movement that results in burning calories (like walking up stairs, gardening, or doing housework). I usually participate in physical activity-</b></p> <p>a) Daily b) Not frequently</p>	<p>Low Medium High</p>	<p>YES or NO</p>
<p><b>If exercising, I check my blood glucose levels</b></p> <p>a) only before exercising b) before and after exercising</p>	<p>Low Medium High</p>	<p>YES or NO</p>
<p style="text-align: center;"><b>STEP 3:</b></p> <p>In the space provided, please add and rank any additional attributes you feel is necessary regarding physical activity.</p>		

**Patient Instructions**

The following questions assess your ability to monitor and use patient generated health data. Please choose the best possible answer or the answer that best describes your experience.

<u>(4) Monitoring and using patient generated health data</u>	<b>STEP 1:</b> (circle one)	<b>STEP 2:</b> (circle one)
<p><b>Why is self-monitoring diabetes important?</b></p> <p>a) It notifies you when you are at a glucose level that is safe to eat sweets b) It allows you to facilitate your glucose changes with your lifestyle</p>	<p>Low Medium High</p>	<p>YES or NO</p>
<p><b>The two most important tests that you can accomplish at home to successfully manage your diabetes are-</b></p> <p>a) Glucose meter and blood pressure test b) Hemoglobin A1C test and a urine test</p>	<p>Low Medium High</p>	<p>YES or NO</p>
<p><b>A food diary is important because...</b></p> <p>a) it can help you see how much weight you have lost since you began monitoring b) it helps you keep track of what you are eating and when your meals are</p>	<p>Low Medium High</p>	<p>YES or NO</p>
<p><b>Do you currently have a food diary or app that helps keep track of your daily eating habits?</b></p> <p>a) No b) Yes</p>	<p>Low Medium High</p>	<p>YES or NO</p>

<b>Have you ever had experience with viewing online test results?</b> a) No b) Yes	Low Medium High	YES or NO
<b>Do you track your glucose levels?</b> a) Yes b) No	Low Medium High	YES or NO
<b>Are you confident in your ability to test your own glucose levels using a glucose meter?</b> a) Yes b) No	Low Medium High	YES or NO
<b>STEP 3:</b> In the space provided, please add and rank any additional attributes you feel is necessary regarding monitoring and using patient generated health data.		

**Patient Instructions**

The following questions assess your understanding of medication usage. Please choose the best possible answer or the answer that best describes your experience.

(5) Medication use	STEP 1: (circle one)	STEP 2: (circle one)
<b>Why do we take medications for diabetes?</b> a) to control blood glucose levels b) to manage headaches and pains related to diabetes side effects	Low Medium High	YES or NO
<b>Diabetes medications do all of the following-</b> a) help the pancreas produce more insulin, help muscles become more sensitive to insulin, limit the liver's release of stored sugar b) desensitizes tissues to effects of insulin, decreases insulin production in the small intestine	Low Medium High	YES or NO
<b>Insulin is presented to the body by-</b> a) being injected or taken by mouth b) only being injected	Low Medium High	YES or NO

<b>A dose of insulin is given according to-</b> a) the amount of blood glucose shown by testing b) your blood pressure resulting from low insulin levels	Low Medium High	YES or NO
<b>Insulin needs to be injected-</b> a) in the vein so that is distributed to the body faster b) just below the skin, for slower absorption into the fat	Low Medium High	YES or NO
<b>I keep track of my medications by-</b> a) creating a routine, writing out my prescriptions, and storing medications in a pillbox. b) keeping them in my cabinet or in my purse and often forget to take them.	Low Medium High	YES or NO
<b>When prescribed a medication, I usually-</b> a) read the side effects and the instructions that come with the medication b) am unaware of side effects of medications or do not read the instructions	Low Medium High	YES or NO
<b>I take my daily medication(s)-</b> a) regularly, as directed by my doctor/pharmacist b) only when symptoms arise	Low Medium High	YES or NO
<p style="text-align: center;"><b>STEP 3:</b></p> <p>In the space provided, please add and rank any additional attributes you feel is necessary regarding medication use.</p>		

**Patient Instructions**

The following questions assess your problem solving abilities. Please choose the best possible answer or the answer that best describes your experience.

(6) Problem solving	STEP 1: (circle one)	STEP 2: (circle one)
<b>What are some activities that can cause you to experience low glucose problems?</b> a) taking too much diabetes medication or engaging in physical	Low Medium High	YES or NO

activity b) not drinking alcohol and eating snacks throughout the day		
<b>What are the best ways to prevent diabetes complications and reduce risk in the future?</b> a) Taking more medication and engaging in more physical activity b) Recognizing glucose levels and making a plan	Low Medium High	YES or NO
<b>Hypoglycemia is a common diabetes complication where you have ____ glucose levels, and a plan of action must be taken in order to solve the problem.</b> a) low b) high	Low Medium High	YES or NO
<b>When encountered with a problem managing your diabetes-</b> a) I get frustrated and struggle to prevent more complications b) I try my best to solve it and usually learn from it	Low Medium High	YES or NO
<b>Think about how the following situation may affect you: You get the flu and notice that your blood glucose levels are higher than normal. What do you do?</b> a) Take irregular amounts of medication and stop monitoring your glucose levels (the flu creates more serious complications than diabetes) b) Monitor your diabetes more frequently and research how the flu can affect your blood glucose levels	Low Medium High	YES or NO
<b>Think about how the following situation may affect you: You are on vacation at a hotel, and do not have regular access to the gym. What do you do?</b> a) Think to yourself, "I'm on vacation, a few missed days at the gym won't hurt" b) Ask the front desk staff about local walking trails and try to walk as much as possible	Low Medium High	YES or NO
<b>Think about how the following situation may affect you: You go to a new restaurant and are unaware of some healthy meal options. What do you do?</b> a) Pay close attention to the main ingredients listed in the menu and make the most informed choice b) Ask the server to provide some suggestions	Low Medium High	YES or NO

**STEP 3:**

In the space provided, please add and rank any additional attributes you feel is necessary regarding problem solving.

**Patient Instructions**

The following questions assess your ability to prevent, detect, and treat complications of your disease. Please choose the best possible answer or the answer that best describes your experience.

<u>(7) Preventing, detecting and treating acute and chronic complications</u>	<b>STEP 1:</b> (circle one)	<b>STEP 2:</b> (circle one)
<b>Hypertension is the term for blood pressure greater than or equal to ___/___ mm Hg</b> a) 140/90 mm Hg b) 100/50 mm Hg	Low Medium High	YES or NO
<b>Low doses of which over the counter drug helps prevent heart attacks?</b> a) Aspirin b) Tylenol	Low Medium High	YES or NO
<b>People with diabetes and blood pressure above ___/___ mm Hg are at a higher risk for cardiovascular, kidney, and eye complications</b> a) 115/75 mm Hg b) 140/90 mm Hg	Low Medium High	YES or NO
<b>ALL of the following activities can help lower high blood pressure-</b> a) managing diabetes by eating foods high in saturated fats, reducing medication use, and increasing salt intake b) exercising regularly, meditating or relaxing more frequently, and managing a healthier diet to control diabetes	Low Medium High	YES or NO
<b>About what percentage of people with diabetes have high blood pressure?</b> a) around 50% b) 25% or less	Low Medium High	YES or NO

<b>How often do you communicate with a diabetes educator or your healthcare professional?</b> a) Frequently b) Never	Low Medium High	YES or NO
<b>Do you get a flu shot every year?</b> a) Yes b) No	Low Medium High	YES or NO
<b>Do you currently smoke or have you ever smoked?</b> a) Yes b) No	Low Medium High	YES or NO
<p style="text-align: center;"><b>STEP 3:</b></p> <p>In the space provided, please add and rank any additional attributes you feel is necessary regarding preventing, detecting and treating acute and chronic complications.</p>		

**Patient Instructions**

The following questions assess your ability to cope with issues related to your disease. Please choose the best possible answer or the answer that best describes your experience.

<u>(8) Healthy coping with psychosocial issues and concerns</u>	<b>STEP 1:</b> (circle one)	<b>STEP 2:</b> (circle one)
<b>Negative emotions have which of the following impacts on the body?</b> a) Induce stress that produces discomfort which can eventually cause more health problems b) Induce stress that can positively affect the body because it lowers your blood glucose levels	Low Medium High	YES or NO
<b>The best way to cope with disease is to-</b> a) have an active approach, working to face the problem head on and seek a solution b) have a passive approach, avoiding problems due to discomfort	Low Medium High	YES or NO
<b>Does stress increase or decrease blood glucose levels?</b> a) increase	Low Medium	YES or NO

b) decrease	High	
<b>When assessing the emotional impact of diabetes in my life, I usually have _____ feelings.</b> a) negative or no feelings b) positive feelings	Low Medium High	YES or NO
<b>My chosen coping mechanism(s) to deal with the effect of stress on my mind and body are-</b> a) relax, rest, spend time with family while maintaining a positive attitude towards life b) not having a plan, but usually I like to be alone	Low Medium High	YES or NO
<b>My attitude towards my disease treatment tends to be-</b> a) annoyed with the self care required and overwhelmed with maintaining my health b) headstrong and committed to keeping up with my healthcare plan	Low Medium High	YES or NO
<b>When diagnosed with diabetes, I reacted-</b> a) Negatively and pessimistically b) Positively and optimistically	Low Medium High	YES or NO
<b>When I think about the complications of the impact of diabetes on my life, I generally-</b> a) become eager to seek support from health professionals, family, and friends b) tend to deal with complications on my own because I do not want to bother anyone	Low Medium High	YES or NO
<b>STEP 3:</b>		
In the space provided, please add and rank any additional attributes you feel is necessary regarding healthy coping with psychosocial issues and concerns.		

## APPENDIX B

Below are the updated PDA questions.

### Patient Instructions

The following questions assess your understanding of Diabetes disease process and treatment. Please choose the best possible answer, or the answer that best describes your experience.

#### (1) Diabetes disease process and treatment

**High blood glucose is \_\_\_\_\_ for my body.**

- a) good
- b) bad

**Diabetes can affect which part(s) of my body?**

- a) Pancreas only
- b) Nerves, Kidneys, Cardiovascular System

**Hemoglobin A1C Test measures-**

- a) my average level of glucose in the blood in the past three months
- b) my level of glucose after consuming sugar over a period of 5-6 hours.

**I usually spend \_\_\_\_\_ managing my diabetes.**

- a) Not much time
- b) A lot of time

**Choose the statement you best identify with.**

- a) I do a good job managing my diabetes and use regular medication regimens, etc.
- b) I do a bad job managing my diabetes, and I struggle to manage my blood glucose levels.

**I understand what is happening to my body when I am experiencing high or low glucose levels.**

- a) Yes
- b) No

### Patient Instructions

The following questions assess your understanding of healthy eating habits. Please choose the best possible answer or the answer that best describes your experience.

#### (2) Healthy eating

**Select the group below that lists foods that ALL contain “carbs.”**

- a) breads, pastas, fruits, dairy products, and sugary foods like desserts  
b) leafy greens like lettuce or spinach, broccoli, lean meats like chicken breasts, eggs

**Which of the following fats and oils are considered healthy?**

- a) olive oil, canola oil, fish oil  
b) coconut oil, palm oil, animal fats, crisco

**While reading a nutritional label, if a serving provides more than 20% of the recommended daily value, that food item is \_\_\_\_\_ in that nutrient.**

- a) High  
b) Low

**The recommended method for cooking meat is-**

- a) roasting, boiling, grilling  
b) frying and sautéing

**When choosing a healthier meal plan, it is often recommended to-**

- a) increase variety of the foods you eat  
b) decrease variety and only eat fruits and vegetables

**Most days of the week ½ of my dinner plate should be filled with-**

- a) non-starchy vegetables such as fresh greens or broccoli  
b) potatoes, bread, and pasta

**When interpreting nutritional information on a food label, I-**

- a) Use the recommended servings of food on my meals based on the content on the label  
b) Disregard the content on the label and eat as much as I want

**When choosing a protein for dinner, the majority of the time I eat-**

- a) beef, deli meats, pork, ham  
b) chicken, turkey, fish

### **Patient Instructions**

The following questions assess your understanding of physical activity. Please choose the best possible answer or the answer that best describes your experience.

### **(3) Physical activity**

**Exercise does ALL of the following for the body-**

- a) raises blood pressure, weakens the heart due to strain, stretches muscles  
b) reduces blood glucose levels and the amount of insulin needed to control those levels, reduces pain and leg cramps, improves moods

**Participating in physical activity usually \_\_\_\_\_ blood glucose levels.**

- a) Lowers

b) Raises
<b>I exercise (definition: physical activity that follows a plan or schedule) generally-</b> a) Once a week or less b) Twice a week or more
<b>Physical activity is known as any movement that results in burning calories (like walking up stairs, gardening, or doing housework). I usually participate in physical activity-</b> a) At least two days per week b) Not frequently
<b>If exercising, I check my blood glucose levels</b> a) only before exercising b) before and after exercising
<b>STEP 3:</b> In the space provided, please add and rank any additional attributes you feel is necessary regarding physical activity.

**Patient Instructions**

The following questions assess your ability to monitor and use patient generated health data. Please choose the best possible answer or the answer that best describes your experience.

<u>(4) Monitoring and using patient generated health data</u>
<b>Why is self-monitoring diabetes important?</b> a) It notifies you when you are at a glucose level that is safe to eat sweets b) It allows you to facilitate your glucose changes with your lifestyle
<b>The two most important tests that you can accomplish at home to successfully manage your diabetes are-</b> a) Glucose meter and blood pressure test b) Hemoglobin A1C test and a urine test
<b>A food diary is important because...</b> a) it can help you see how much weight you have lost since you began monitoring b) it helps you keep track of what you are eating and when your meals are
<b>Do you currently have a food diary or app that helps keep track of your daily eating habits?</b>

- a) No  
b) Yes

**Have you ever had experience with viewing online test results?**

- a) No  
b) Yes

**Do you track your glucose levels?**

- a) Yes  
b) No

**Are you confident in your ability to test your own glucose levels using a glucose meter?**

- a) Yes  
b) No

### **Patient Instructions**

The following questions assess your understanding of medication usage. Please choose the best possible answer or the answer that best describes your experience.

#### (5) Medication use

**Why do we take medications for diabetes?**

- a) to control blood glucose levels  
b) to manage headaches and pains related to diabetes side effects

**Diabetes medications do all of the following-**

- a) help the pancreas produce more insulin, help muscles become more sensitive to insulin, limit the liver's release of stored sugar  
b) desensitizes tissues to effects of insulin, decreases insulin production in the small intestine

**Insulin is presented to the body by-**

- a) Mouth  
b) Injection

**A dose of insulin is given according to-**

- a) your blood glucose levels  
b) your blood pressure

**Insulin needs to be injected-**

- a) in the vein so that is distributed to the body faster  
b) just below the skin, for slower absorption into the fat

**I keep track of my medications by-**

- a) creating a routine, writing out my prescriptions, and storing medications in a pillbox.

b) keeping them in my cabinet or in my purse and often forgetting to take them.

**When prescribed a medication, I usually-**

- a) read the side effects and the instructions that come with the medication
- b) am unaware of side effects of medications or do not read the instructions

**I take my daily medication(s)-**

- a) regularly, as directed by my doctor/pharmacist
- b) only when symptoms arise

**Patient Instructions**

The following questions assess your problem solving abilities. Please choose the best possible answer or the answer that best describes your experience.

(6) Problem solving

**What are some activities that can cause you to experience low glucose problems?**

- a) taking too much diabetes medication or engaging in physical activity
- b) eating a lot of snacks throughout the day

**Hypoglycemia is a common diabetes complication where you have \_\_\_\_ glucose levels, and a plan of action must be taken in order to solve the problem.**

- a) low
- b) high

**When encountered with a problem managing your diabetes-**

- a) I get frustrated and struggle to prevent more complications
- b) I try my best to solve it and usually learn from it

**Think about how the following situation may affect you: You get the flu and notice that your blood glucose levels are higher than normal. What do you do?**

- a) Take irregular amounts of medication and stop monitoring your glucose levels (the flu creates more serious complications than diabetes)
- b) Monitor your diabetes more frequently, contact your healthcare provider, and research how the flu can affect your blood glucose levels

**Think about how the following situation may affect you: You are on vacation at a hotel, and do not have regular access to the gym. What do you do?**

- a) Think to yourself, "I'm on vacation, a few missed days at the gym won't hurt"
- b) Ask the front desk staff about local walking trails and try to walk as much as possible

**Think about how the following situation may affect you: You go to a new restaurant and are unaware of some healthy meal options. What do you do?**

- a) Pay close attention to the main ingredients listed in the menu and make the most informed

- choice  
b) Ask the server to provide some suggestions

**Patient Instructions**

The following questions assess your ability to prevent, detect, and treat complications of your disease. Please choose the best possible answer or the answer that best describes your experience.

(7) Preventing, detecting and treating acute and chronic complications

**Hypertension is the term for blood pressure greater than or equal to \_\_\_/\_\_\_ mm Hg**

- a) 140/90 mm Hg  
b) 100/50 mm Hg

**Low doses of which over the counter drug can prevent heart attacks?**

- a) Aspirin  
b) Tylenol

**People with diabetes and blood pressure above \_\_\_/\_\_\_ mm Hg are at a higher risk for cardiovascular, kidney, and eye complications**

- a) 115/75 mm Hg  
b) 140/90 mm Hg

**Which of the following sets of activities can help lower high blood pressure?**

- a) managing diabetes by eating foods high in saturated fats, reducing medication use, and increasing salt intake  
b) exercising regularly, meditating or relaxing more frequently, and managing a healthier diet to control diabetes

**About what percentage of people with diabetes have high blood pressure?**

- a) around 50%  
b) 25% or less

**How often do you communicate with a diabetes educator or your healthcare professional?**

- a) Frequently  
b) Never

**Do you get a flu shot every year?**

- a) Yes  
b) No

**Do you currently smoke or have you ever smoked?**

- a) Yes  
b) No

**Patient Instructions**

The following questions assess your ability to cope with issues related to your disease. Please choose the best possible answer or the answer that best describes your experience.

**(8) Healthy coping with psychosocial issues and concerns**

**Negative emotions have which of the following impacts on the body?**

- a) Induce stress that produces discomfort which can eventually cause more health problems
- b) Induce stress that can positively affect the body because it lowers your blood glucose levels

**The best way to cope with disease is to-**

- a) have an active approach, working to face the problem head on and seek a solution
- b) have a passive approach, avoiding problems due to discomfort

**Does stress increase or decrease blood glucose levels?**

- a) increase
- b) decrease

**When assessing the emotional impact of diabetes in my life, I usually have \_\_\_\_\_ feelings.**

- a) negative or no feelings
- b) positive feelings

**My chosen coping mechanism(s) to deal with the effect of stress on my mind and body are-**

- a) relax, rest, spend time with family while maintaining a positive attitude towards life
- b) not having a plan, but usually I like to be alone

**My attitude towards my Diabetes treatment tends to be-**

- a) annoyed with the self care required and overwhelmed with maintaining my health
- b) headstrong and committed to keeping up with my healthcare plan

**When diagnosed with diabetes, I reacted-**

- a) Negatively and pessimistically
- b) Positively and optimistically

**When I think about the complications of the impact of diabetes on my life, I generally-**

- a) become eager to seek support from health professionals, family, and friends
- b) tend to deal with complications on my own because I do not want to bother anyone