

FORMATIVE ASSESSMENT OF THE NEEDS OF
OKLAHOMA COOPERATIVE EXTENSION SERVICE
COUNTY EDUCATORS REGARDING TYPE 2
DIABETES PREVENTION PROGRAMMING

By

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Abstract: Due to the increase in obesity and prevalence of pre-diabetes and type 2 diabetes and its complications, prevention for those at risk for type 2 diabetes or with an existing pre-diabetes diagnosis needs to be a priority for health educators and professionals. The purpose of this study was to conduct formative assessment of the needs of Oklahoma Cooperative Extension Service (OCES) Family and Consumer Science County Educators regarding type 2 diabetes prevention programming (DPP). A formative assessment questionnaire using a 5-point Likert scale was developed including questions regarding the interests of the County Educators and their perception of their constituents regarding offering the existing Centers for Disease Control's (CDC) certified DPP, a modified CDC DPP, or creation of an OCES DPP program. Regarding an OCES DPP, County Educators were asked questions regarding the ideal program format such as the length of sessions, number of sessions per month, and total number of months. Other questions asked pertained to the willingness of the County Educators and their perception of their constituents regarding specific program components for a new OCES DPP program such as recording and tracking food intake, physical activity, and weight loss. Additionally, questions about interest in specific session topics were asked. This study was approved by the Oklahoma State University Institutional Review Board for Human Subjects prior to data collection. Thirty-eight County Educators voluntarily completed the formative assessment questionnaire. Data were analyzed using frequency and Chi-square procedures with PC SAS for Windows, Version 9.3. County Educators expressed interest in all of the DPP programs; however, County Educators expressed highest interest in a modified CDC DPP or a new OCES DPP. County Educators expressed highest interest in four-to-six, one-hour sessions over a two-to-three month period with food logs, physical activity logs, on-site weighing, and food demonstrations. County Educators also expressed interest in twenty-three various session topics. If an OCES diabetes prevention program is developed and piloted, further formative assessment would be necessary to create a program that best meets the needs of County Educators and their constituents.

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CHAPTER I

INTRODUCTION

The prevalence of obesity and its related complications is increasing at a rapid rate. Obesity has been associated with increased risk for cardiovascular disease, hypertension, atherosclerosis, type 2 diabetes mellitus, some cancers, decreased immunity, and trauma to joints (Bray, 1985). Type 2 diabetes is most commonly associated with excess body weight and additional comorbidities. In 2011, approximately 25.8 million people (8.3% of the population) in the United States had diabetes (Centers for Disease Control and Prevention [CDC], 2014). An estimated additional one-fourth of the population in the United States may have undiagnosed type 2 diabetes (American Diabetes Association [ADA], 2014a). Furthermore, an estimated 33% of the national population has pre-diabetes, with only about 10% of those patients having been told by a physician that they are pre-diabetic (CDC, 2012). In the state of Oklahoma, it is estimated that 29.8%-35.4% of the population (~1,148,000-1,364,000 people) is obese and that 11.2-13.2% of the population has been diagnosed with type 2 diabetes, ranking the state forty-third for diabetes prevalence in the United States (United Health Foundation, 2013a; United Health Foundation, 2013b; United State Census Bureau, 2013). In fact, in 2012, diabetes was the seventh leading cause of death in Oklahoma (Oklahoma State Department of Health [OSDH], 2014). According to the Harold Hamm Diabetes Center, an outreach program of the University of Oklahoma, in

2010 an estimated additional 678,300 Oklahoma citizens had pre-diabetes (Harold Hamm Diabetes Center, 2010).

A study conducted by Zhuo, Zang, and Hoerger (2013) reported the direct medical cost related to diabetes in 2013 was \$176 billion with an additional \$69 billion lost in reduced work productivity. The average individual cost over a lifetime is \$85,200 for those with diabetes due to direct treatment and treatment of comorbidities, with the cost increasing with the length of the diagnosis (Zhuo et al., 2013). Reducing the prevalence of type 2 diabetes is, therefore, very important for reducing national medical costs.

Due to the increase in obesity and prevalence of pre-diabetes and type 2 diabetes and its complications, prevention for those at risk for type 2 diabetes or with an existing pre-diabetes diagnosis needs to be a priority for health educators and professionals. A study conducted by Yamaoka and Tang (2005) reported that long-term lifestyle education was very effective in reducing the incidence of and risk for type 2 diabetes compared to a control group receiving dietary education alone. Research conducted has shown that those with pre-diabetes or with other diabetes risk factors can significantly reduce their risk of type 2 diabetes by reducing body weight by 5-7% and getting 150 minutes of moderate physical activity a week (ADA, 2014a). Lifestyle education is paramount to individuals understanding the importance of changing their lifestyle behaviors and for learning effective strategies in accomplishing the weight reduction and physical activity goals. In Oklahoma, in 2012, only 60.7% of all diagnosed diabetic patients had ever received any form of diabetes self-management education (CDC, 2012). The Centers for Disease Control (CDC) offers a lifestyle change Diabetes Prevention Program (DPP) for community organizations to use to reduce the risk and prevalence of type 2 diabetes for those at risk through the use of lifestyle coaches and education (CDC, 2013b).

In Oklahoma, Oklahoma Cooperative Extension Service (OCES) Family and Consumer Science (FCS) County Educators are employed in most counties to provide science-based education to residents in each county (Oklahoma Cooperative Extension Service [OCES], 2014). The purpose of this study was to conduct formative assessment of the needs of OCES FCS County Educators regarding type 2 diabetes prevention programming.

Formative Evaluation Objectives:

O₁: To conduct formative assessment of OCES FCS County Educators regarding the CDC Diabetes Prevention Program (DPP).

O₂: To conduct formative assessment of OCES FCS County Educators regarding the development of an OCES Diabetes Prevention Program.

Abbreviations and Definitions:

OCES- Oklahoma Cooperative Extension Service

CDC- Centers for Disease Control

DPP- Diabetes Prevention Program

FPG- Fasting Plasma Glucose

OGTT- Oral Glucose Tolerance Test

A1C- A measure of glycosylated blood glucose.

Look AHEAD- Action for Health in Diabetes; a cardiovascular disease prevention program for those with type 2 diabetes.

CHAPTER II

REVIEW OF LITERATURE

Prediabetes and Type 2 Diabetes Mellitus

Diabetes can be categorized into four main classes: type 1, type 2, gestational, and other (ADA, 2014a). Type 1 diabetes is characterized by little-to-no insulin secretion from the beta cells of the pancreas. This lack of insulin results in high blood glucose levels and altered metabolic pathways. Type 2 diabetes is characterized by inadequate insulin secretion or dysfunctional insulin or insulin receptors, causing high blood glucose levels. Gestational diabetes occurs during pregnancy and is characterized by abnormally high blood glucose levels which can then result in type 2 diabetes post-pregnancy if not controlled during the pregnancy. Diabetes not characterized by the first three conditions is categorized in the “other” category. A more recent category is pre-diabetes in which blood glucose levels are higher than normal levels but still not high enough to be considered diabetic (CDC, 2012).

A1C is a measurement of the percentage of hemoglobin from the blood that is glycosylated (Nathan et al., 2008). A higher percentage of glycosylated blood indicates chronic elevated blood glucose, whereas a lower percentage indicates normalized blood glucose. A study conducted by Nathan et al. (2008) supported that A1C measures have a direct relationship with average glucose levels, and therefore, is a valid tool for evaluating blood glucose management.

Clinical diagnosis for type 1 and type 2 diabetes includes fasting plasma glucose levels (FPG) higher than 126 mg/dL, two hour plasma glucose levels after a 75 g oral glucose tolerance test (OGTT) higher than 200 mg/dL, or an A1C measurement of greater than 6.5. The clinical diagnosis for pre-diabetes includes FPG levels between 100 mg/dL and 125 mg/dL, plasma glucose levels between 140 mg/dL and 199 mg/dL after a two-hour OGTT, or an A1C between 5.7 and 6.4. Gestational diabetes can be diagnosed by one of two methods, both of which are conducted during 24-28 weeks gestational age. The first method is measuring fasting blood glucose and blood glucose one and two hours after a 75g OGTT. Fasting plasma levels higher than 95 mg/dL, one-hour plasma glucose levels higher than 180 mg/dL, or two-hour plasma glucose levels higher than 153 mg/dL indicates gestational diabetes. The second method is a two-step method in which a 50g OGTT is administered. If one-hour plasma glucose levels are higher than 140 mg/dL, a different 100g OGTT is administered. Plasma glucose levels higher than 140 mg/dL after three hours indicates gestational diabetes (ADA, 2014a).

As stated previously, in 2011, approximately 25.8 million people in the United States had diabetes and an estimated 33% of the national population had pre-diabetes, with only about 10% of those patients having been told by a physician that they were pre-diabetic (CDC, 2012). In the state of Oklahoma, it is estimated that 11.2-13.2% of the population has been diagnosed with type 2 diabetes (United Health Foundation, 2013a) and that there may be an additional 678,300 Oklahoma citizens with pre-diabetes (Harold Hamm Diabetes Center, 2010). In 2012, diabetes was the seventh leading cause of death in Oklahoma. Additionally, one in five older adults have diabetes (OSDH, 2014). Nationally, 25.9% of Americans over 65 years of age have diabetes (ADA, 2014b).

Type 2 Diabetes Mellitus Complications

Type 2 diabetes is associated with health complications such as neuropathy, renal failure, and cardiovascular disease, the number one cause of death for those with type 2 diabetes (OSDH, 2014). In 2010, the leading cause of overall death was heart disease and the top fifteen leading causes of death included cancers, stroke, kidney disease, diabetes mellitus, and hypertension (United States Department of Health and Human Services [USDHHS], 2013). Type 2 diabetes greatly increases the risks of developing the previously stated causes of death. A study conducted by the Emerging Risk Factors Collaboration set out to determine the risk of disease-related deaths for those with diabetes. The researchers analyzed ninety-seven different studies that included a diagnosis of diabetes as well as cause of death in order to calculate hazard ratios. The researchers found that overall death rates were much higher for those with diabetes than those without diabetes. Furthermore, they found that diabetes was highly associated with deaths due to cancer such as liver, pancreas, ovary, colorectum, lung, bladder, and breast cancers; deaths due to vascular diseases; and other unknown causes. On average, participants with diabetes died six years younger due to vascular disease as compared to non-diabetes patients who died of vascular disease (The Emerging Risk Factors Collaboration, 2011). Furthermore, uncontrolled blood sugar has also been associated with overactive bladder symptoms as well as with urinary urgency and nocturia (Chui, Huang, Wang, & Kuo, 2012).

As previously mentioned, there is a high incidence of diabetes among older adults. A report on the pathophysiology of diabetes in older adults by Gambert and Pinkstaff (2006) cited one study that reported those with diabetes were forty-six times more likely to be hospitalized for neuropathy than those without. They also reported that those with diabetes were ten times more likely to be hospitalized for congestive heart failure, ten times more likely to be hospitalized for atherosclerosis, and six-to-ten times more likely to be hospitalized for heart disease. The report

also stated that diabetes is the most common cause of blindness in the elderly (Gambert & Pinkstaff, 2006).

A consensus report by Kirkman et al. (2006) further expanded on many of the complications of type 2 diabetes in older adults. They stated that older adults with type 2 diabetes have the highest rates of lower-extremity amputation, heart attack, visual problems, and renal failure. The longer the diagnosis, the higher the risk individuals with type 2 diabetes have for developing these comorbidities. However, cardiovascular disease and peripheral neuropathy were not associated with the time of onset according to a study reported by Kirkman et al. (2006). They also discovered that older adults with diabetes were two times more likely to develop Alzheimer's disease and multi-infarct dementia due to the negative effects of long-term exposure to hypo- and hyperglycemia on the brain. Furthermore, they were at a higher risk for functional impairment due to neuropathy, muscle and joint pain, multiple medication interactions, obesity, etc. This also put them at a higher risk for falls and fractures. Kirkman et al. (2006) also stated that one in five older adults with diabetes had visual impairment associated with vascular disease and neuropathy.

The Need for Education Intervention

Those with pre-diabetes are at a much higher risk for developing type 2 diabetes than those without pre-diabetes or a family history of type 2 diabetes. In one study it was found that 11% of those diagnosed with pre-diabetes developed type 2 diabetes within the three-year follow-up (CDC, 2013a). However, it does not have to be an inevitable diagnosis—those who are told of their pre-diabetic condition can take steps to reverse their condition and significantly reduce their blood sugar and modifiable risk factors for developing type 2 diabetes. Healthful weight loss of 5-7% body weight and moderate physical activity have shown to greatly reduce the incidence and risk of developing type 2 diabetes (ADA, 2014a). A meta-analysis study conducted by Yamaoka and Tango (2005) reported that lifestyle education that emphasized weight loss and physical

activity as compared with “conventional education” decreased plasma glucose levels following an OGTT by 0.84 mmol/l, and decreased the one-year relative risk (RR) by approximately 50%.

Yamaoka and Tango identified lifestyle education as that which involves both diet and exercise education, and conventional education as that which includes “usual exercise with or without general information about diet or general dietary advice about healthy food choices” (p. 2780).

In order to decrease the prevalence and incidence of type 2 diabetes and the associated comorbidities discussed earlier, an increased emphasis for pre-diabetes awareness and lifestyle and behavior modification must be made through education. A study conducted by the Diabetes Prevention Program Research Group (2002) looked at the effects on type 2 diabetes incidence for three groups of individuals who were at high risk for developing type 2 diabetes: 1) the Diabetes Prevention Program lifestyle intervention, 2) “standard lifestyle recommendations” and metformin (a hypoglycemic agent) intervention, and 3) a placebo pill with no education intervention. The study found that the incidence of type 2 diabetes of those on the DPP lifestyle intervention decreased by 58% as compared to the placebo group. Those participants also had the greatest reduction in weight and average blood glucose as measured by A1C. Furthermore, a ten-year follow-up study conducted on the DPP participants found that those in the lifestyle modification group continued to have a decreased incidence and delayed onset of type 2 diabetes as compared to the metformin and placebo groups. The long-term cumulative incidence of diagnosis was 34% lower, and onset was delayed, on average, by four years (Diabetes Prevention Program Research Group, 2009).

The CDC’s DPP is an extensive program that includes 16 weekly sessions and a minimum of six additional monthly follow-up sessions (CDC, 2013c). The program incorporates both group sessions and one-on-one sessions with a lifestyle coach, who is responsible for teaching the curriculum as well as leading discussions. The program is designed to have lifestyle coaches meet with participants to help identify emotional issues and to develop strategies for overcoming

barriers to the lifestyle changes encouraged and discussed in the curriculum. Furthermore, lifestyle coaches review food and activity logs, discuss homework assignments, and chart participant weight loss progress. The group setting was established to allow ideas to be shared among the participants as well as for them to encourage one another along the process. There are strict guidelines for facilities that desire to become certified DPP providers, and a follow-up on how the facility is complying with the requirements is conducted throughout the time that the program is offered (CDC, 2013c).

As discussed above, there has been great success for those who are at risk for developing type 2 diabetes as well as those with pre-diabetes in decreasing the prevalence of type 2 diabetes or in delaying the onset through participation in the DPP. However, this program may not always be realistic or suitable for all sites that offer nutrition education. OCES FCS County Educators are responsible for a number of different program and educational areas. For example, they are responsible for education on food and nutrition, finances, family relations and child development, housing, and safety. Many are also responsible for 4-H programming as well. Nutrition education is just one facet of their responsibilities. As a result, the CDC's DPP may not be feasible for OCES FCS County Educators due to the time and resources needed to conduct the program as it is required and intended. A current study looking at the effectiveness of an at-home, self-administered diabetes prevention program specifically designed for men acknowledged the need for a program that is not as time and resource intensive—especially for small rural areas (Aguiar, Morgan, Collins, Plotnikoff, Young, Callister, 2014). They also cited the cost of the DPP as \$1,400 per person, with staffing contributing the greatest cost. However, because of the growing problem of type 2 diabetes and its complications in Oklahoma, there is a need for diabetes prevention programming. This gap in the need for a diabetes prevention program and a current program that may not be feasible for OCES FCS County Educators led to the current study.

The Academy of Nutrition and Dietetics (AND), formerly known as the American Dietetic Association, has written a position paper on weight management—including food intake, food composition, eating frequency, physical activity, weight loss pills, and weight loss surgeries (American Dietetic Association, 2009). Based on prior research, the AND recommends a caloric deficit of 500-1000 kilocalories a day, whether from decreased food intake, an increase in energy expenditure, or a combination of the two. This deficit follows the recommendation of a weight loss of one to two pounds a week. Physical activity is stated as very important for helping in weight loss in addition to dietary changes. Furthermore, the AND states that it may be vital for preventing weight regain, as well as improving obesity-related comorbidities (such as type 2 diabetes). The AND also supports the use of behavior interventions, with long-term follow-ups, although one specific strategy may not be beneficial for everyone (American Dietetic Association, 2009).

Alternative Type 2 Diabetes Prevention Programming

The unfeasibility of the DPP for some settings led to a pilot study at two YMCA facilities in Indianapolis (Ackermann, Finch, Brizendine, Zhoue, & Marrero, 2008). In this study, both facilities initially offered screening to determine those with prediabetes or those at risk of developing type 2 diabetes. Based upon the screening results, both facilities offered personalized advice about weight loss and physical activity, and gave supplemental materials that further addressed these interventions. Additionally, one facility strongly encouraged those with prediabetes or at risk for type 2 diabetes to enroll in their diabetes prevention program, a modified version of the DPP in which the YMCA only offered group-based intervention. The other facility educated the at-risk participants about outside wellness programs and YMCA facility access, but did not offer a behavioral modification curriculum. Those participants in the outside wellness program referral group served as a control compared to the modified DPP. The modified DPP facility received several days of training from knowledgeable DPP investigators on the

curriculum in order to ensure the educators would be able to adhere to a modified version of the DPP curriculum in a group-based *only* manner. The YMCA educators offered a version of the DPP curriculum that was very similar to the original curriculum, but that was tailored to group sessions, instead of one-on-one. This study found participants in the modified DPP had similar outcomes to those in the DPP pilot study (Diabetes Prevention Program Research Group, 2009). The participants experienced a meaningful amount of weight loss both at the 4-6 month follow-up and the 12-14 month follow-up, one of the major outcome goals of the DPP for reducing the risk of type 2 diabetes. The participants lost, on average, 6% of their original body weight, and experienced significant decreases in total cholesterol. These results were significantly different from the control group. This pilot study was able to demonstrate that the DPP can be offered in a modified manner that is still successful, but more feasible for facilities that lack both financial and staffing resources. In this study, the financial cost of staffing was reduced by 50% attributable to fewer staff members needed to facilitate group sessions instead of one-on-one sessions (Ackermann et al., 2008).

A study conducted by Mason et al. (2011) examined the affects of weight loss through diet, physical activity, or a combination of physical activity and diet on insulin resistance in women with type 2 diabetes. Participants assigned to the dietary weight loss arm of the study were enrolled in a lifestyle behavior modification program modeled after the CDC's certified DPP and the Look AHEAD programs. The intervention consisted of two individual consultations with a dietitian followed by weekly group meetings for six months and then monthly group meetings for six months. The women in this modified group-based DPP and Look AHEAD intervention group experienced significant weight loss as well as increased insulin sensitivity. Although this was conducted on individuals with type 2 diabetes, it is assumed that similar results would occur in those with pre-diabetes or at risk for developing type 2 diabetes (Mason et al., 2011).

As mentioned above, currently Aguiar et al. (2014) are conducting research on a self-administered diabetes prevention program specifically tailored for pre-diabetic males. This six-month program is called PULSE (Prevention Using LifeStyle Education), and includes home weighing, food logs, and physical activity as part of its strategy to modify behavior and facilitate weight loss. Participants received a standardized orientation at the beginning of the program and were given the PULSE curriculum, which consisted of a handbook of key information for weight loss and physical activity, a support book on physical activity, and a SHED-IT program packet that contained a DVD, handbook, log book, tape measure, pedometer, and a food calorie count booklet. Assessments are being conducted at baseline, three months, and six months. The primary outcome is weight loss, while secondary outcomes are HbA₁C, fasting plasma glucose levels, waist circumference, body composition, blood pressure, diet quality, aerobic fitness, muscular fitness, and physical activity (Aguiar et al., 2014, p.133). The study has yet to be completed; however, if the program does show effective participant behavior modification, the implications would be far reaching in terms of implementing a type 2 diabetes prevention program in a time- and cost-effective method for the general population.

Use of Self-Monitoring in a Diabetes Prevention Program

A major component of the CDC's certified DPP that allows for behavior modification is the use of self-monitoring. Self-monitoring began as a tool used in psychotherapy and is often used as part of behavior therapy. Korotitsch and Nelson-Gray (1999) defined self-monitoring as an assessment procedure that uses client-dependent data collection. It is comprised of the client recognizing a target behavior and then recording the behavior along with any other necessary information regarding the behavior. By recording these targeted behaviors, the client becomes more aware of actions, thoughts, and feelings. Because of this, self-monitoring can be used not only for data collection, but also for treatment purposes (i.e. behavior modification). Korotitsch and Nelson-Gray also asserted that self-monitoring causes the client to recognize personal control

over behavior as well as provides continuous feedback of behavior. This continuous feedback can show either noncompliance or progress in order to encourage the client to continue to change behavior. They cited that various studies have shown clients increase reactivity—a change in the occurrence of a behavior—due to self-monitoring (Korotitsch & Nelson-Gray, 1999).

Futhermore, Qi & Dennis (2000) stated that self-monitoring is often considered the “cornerstone” of obesity treatment and that it is the most published weight loss behavior. Because there are so many behavior modification approaches that can be overwhelming for those attempting to lose weight, Qi and Dennis looked at various behavior modification techniques used for weight loss. Their goal was to evaluate which approaches were truly effective at aiding in weight loss. Their study consisted of fifty overweight women who were enrolled in a 6-month multi-faceted weight loss program. The participants completed a 26-item Eating Behavior Inventory (EBI) questionnaire prior to treatment and at the end of the six months. They found a strong correlation between significant weight loss and change in EBI scores. Several of those EBI items included self-monitoring behaviors such as food logs and tracking weight. Qi and Dennis were able to further demonstrate the importance of self-monitoring for meaningful weight loss and its use in successful weight loss programs (Qi & Dennis, 2000).

Rationale for Using Formative Assessment

Formative assessment is used in schools or other learning facilities to determine the teaching or curriculum effectiveness (Cornelius, 2013). Types of assessment can be formative or summative. Summative assessment simply occurs at the end of the instruction and determines how much and to what extent the subject was learned. Formative assessment occurs during the teaching process. Applying the findings of the assessment allows for educators to change the instruction or the approach taken in order to increase student learning and to meet established objectives (Cornelius, 2013).

Other education programs have also conducted formative assessment to determine the effectiveness of the program, as well as how to make it better for the participants. One example is the Cooking with Kids (CWK) curriculum in elementary schools in Santa Fe, New Mexico. In this pilot study, both Extension-based paraprofessional nutrition educators (NE) and Family and Consumer Science Extension Agents (EA) received training in the CWK curriculum. The educators completed four different surveys to gain insight into demographics, preferences, educator comfort and skills, acceptability, clarity, and benefit. The four surveys were given pre-training, post-training, at 4-months follow-up, and at 8-months follow-up. The researchers found that after training, the educators reported greater knowledge and more positive attitudes towards the curriculum. Furthermore, many of the educators reported that they were likely to use the curriculum again. The study was able to identify the need for both education and behavior change theory as well as formative assessment of the curriculum in order to create an effective program. In their conclusion they gave the recommendations to educators to

“Use formative assessment to understand target audience needs and strengths. For example, ask trainees and their supervisors what an ideal training on the topic would look like, including content, format, length, and location. Incorporate findings into training design and implementation” (Diker et al., 2012, p. 504).

The purpose of using formative assessment in this study was to determine what OCES FCS County Educators have already enacted and already know about their constituents. By gaining information about their needs and their willingness to conduct certain activities, a diabetes prevention program that most suits their constituents can be enacted. Educators must determine most effective teaching strategies in order to facilitate change.

CHAPTER III

METHODS

In order to conduct formative assessment on the interests of the County Educators to offer a certified or modified CDC DPP, or determine the needs and interests of the County Educators regarding developing an OCES type 2 diabetes prevention program, a PowerPoint presentation on the principles of diabetes prevention and the CDC's DPP was developed and presented to OCES FCS County Educators attending one of two "Dining with Diabetes" in-services in spring 2014. The presentation included an overview of the DPP to inform the County Educators on the requirements of the DPP for certification, the responsibilities of the County Educator, the responsibilities of the participants, examples of lesson topics and homework assignments, and success rates of the program. This was presented in a non-biased manner to ensure the feedback received accurately reflected the needs of the County Educators and their constituents. Following the presentation, County Educators were asked to voluntarily complete a formative assessment questionnaire (Appendix A).

The formative assessment questionnaire included questions about the interests of the County Educators and their perception of their constituents regarding offering the certified DPP, a modified DPP, or creating a new OCES FCS program using a 5-point Likert scale ("very interested," "interested," "neutral," "not interested," "not interested at all"). Regarding a new OCES DPP, County Educators were asked organizational format questions, such as the number of

sessions a month, total number of months, and session lengths. Other questions asked pertained to the willingness of the County Educators and their perception of their constituents regarding specific program components of a new OCES program such as recording and tracking food intake, physical activity, and weight loss. These were also asked using a 5-point Likert scale of “very interested,” “interested,” “neutral,” “not interested,” “not interested at all.” Questions about interest in specific topics were asked using a 5-point Likert scale that included “definitely yes,” “yes,” “neutral,” “no,” “definitely no.” Lastly, two open-ended questions were also included to gain insight on preference for additional topics not listed and to allow Educators to state any questions or comments they might have.

Oklahoma State University Institutional Review Board Approval

The formative assessment questionnaire, participant information sheet, introduction script, and assessment procedure for this study were approved by the Oklahoma State University Institutional Review Board for Human Subjects prior to data collection (Appendix B).

Data Analysis

Data were analyzed using the frequency and Chi-square procedures with PC SAS for Windows, Version 9.3 (SAS Institute, Cary, NC). Comments to open-ended questions were grouped by common responses.

CHAPTER IV

RESULTS

A total of thirty-eight OCES FCS County Educators completed the formative assessment questionnaire, twenty-two at the first “Dining with Diabetes” in-service, and sixteen at the second “Dining with Diabetes” in-service. Chi square analysis was used to compare the two in-service groups. Because there was no significant difference in responses between the two groups, the data from both in-service groups were analyzed as a whole. Additionally, Chi-square analysis was run between questions one and five, questions one and three, questions three and five, questions two and six, questions two and four, and questions four and six. These were run to determine if there was a significant difference in the preference of the County Educators or the perceived constituent preference for one diabetes prevention program or another. However, because the sample size was small and most educators did not respond with disinterest, the analyses had a high warning. When chi square analysis shows a warning, the results cannot be considered valid.

Table 1 shows response frequencies for questions related to interest in the CDC’s DPP.

Responses of “Interested” or “Very Interested” were classified as “interest”, while “Not Interest At All” or “Not Interested” were classified as “disinterest”. Questions regarding County Educator interest and perceived constituent interest were as follows: 40% of Educators were interested in offering the certified DPP, with 32% perceived interest for their constituents; 75% of Educators were interested in offering a modified DPP, with 69% perceived interest for their constituents.

Table 1. Interest in the Centers for Disease Control (CDC) Type 2 Diabetes Prevention Program (DPP).

Questions regarding the CDC's DPP	Interest ¹				
	Not Interested At All	Not Interested	Neutral	Interested	Very Interested
	n (%)	n (%)	n (%)	n (%)	n (%)
Educator interest in becoming a certified DPP provider	3 (8%)	9 (24%)	11 (29%)	9 (24%)	6 (16%)
Constituent interest in enrolling in a certified CDC DPP	2 (5%)	5 (13%)	19 (50%)	11 (29%)	1 (3%)
Educator interest in offering a modified CDC DPP	0 (0%)	1 (3%)	8 (22%)	16 (43%)	12 (32%)
Constituent interest in enrolling in a modified CDC DPP	1 (3%)	0 (0%)	11 (29%)	20 (53%)	6 (16%)

¹Percentages in a row may not total to 100 due to rounding.

Table 2. Interest in an Oklahoma Cooperative Extension Service (OCES) Type 2 Diabetes Prevention Program (DPP).

Questions regarding an OCES DPP	Interest ¹				
	Not Interested At All	Not Interested	Neutral	Interested	Very Interested
	n (%)	n (%)	n (%)	n (%)	n (%)
Educator interest in offering a DPP specifically for OCES	0 (0%)	1 (3%)	5 (13%)	15 (40%)	17 (45%)
Constituent interest in a DPP specifically for OCES	0 (0%)	2 (5%)	4 (11%)	26 (68%)	6 (16%)

¹Percentages in a row may not total to 100 due to rounding.

Table 2 shows the response frequencies pertaining to interest in an OCES type 2 diabetes prevention program. Educator interest and perceived constituent interest were as follows: 85% of Educators expressed interest, with 84% perceived interest for their constituents.

Table 3 reflects response frequencies for questions regarding the formatting of an OCES diabetes prevention program. Regarding the number of sessions per month, 32% expressed interest in one session per month, 54% expressed interest in two sessions per month, 5% expressed interest in three sessions per month, and 8% expressed interest in four or more sessions per month.

Regarding perceived number of months 23% indicated one month, 29% indicated two months, 34% indicated three months, and 14% indicated four or more months. Educator input for the length of sessions was as follows: 3% indicated 30-minute sessions, 22% indicated 45-minute sessions, 47% indicated 60-minute sessions, 19% indicated 90-minute sessions, and 8% indicated 120-minute sessions.

Table 3. Organizational Format of an Oklahoma Cooperative Extension Service (OCES) Type 2 Diabetes Prevention Program (DPP).

Questions regarding an OCES DPP	Number ¹				
	0	1	2	3	4+
	n (%)	n (%)	n (%)	n (%)	n (%)
Number of sessions per month	0 (0%)	12 (32%)	20 (54%)	2 (5%)	3 (8%)
Number of months constituents would attend	0 (0%)	8 (23%)	10 (29%)	12 (34%)	5 (14%)
	Time ¹				
	30 min.	45 min.	60 min.	90 min.	120 min.
	n (%)	n (%)	n (%)	n (%)	n (%)
Session length	1 (3%)	8 (22%)	17 (47%)	7 (19%)	3 (8%)

¹Percentages in a row may not total to 100 due to rounding.

To determine the total number of sessions, each Educator's response for the number of sessions per month they perceived their constituents would attend per month (Questions 7) was multiplied by the Educator's response for the total number of months they perceived their constituents would attend (Question 8). Table 4 shows the results of this analysis. One single session for program length was indicated by 9% of the Educators, two total sessions was indicated by 11% of the Educators, three total sessions was indicated by 11% of the Educators, four total sessions was indicated by 37% of the Educators, six total sessions was indicated by 26% of the Educators, and eight total sessions was indicated by 6% of the Educators.

Table 4. Total number of sessions of an Oklahoma Cooperative Extension Service (OCES) Type 2 Diabetes Prevention Program (DPP).

Total Number of Sessions ^{1,2}							
1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)	6 n (%)	7 n (%)	8 n (%)
3 (9%)	4 (11%)	4 (11%)	13 (37%)	0 (0%)	9 (26%)	0 (0%)	2 (6%)

¹Total number of sessions was calculated by multiplying each Educator's response for the number of sessions they perceived their constituents would attend per month by the Educator's response for the number of months they perceived their constituents would attend.

²Percentages may not total to 100 due to rounding.

Table 5 shows response frequencies for questions regarding program components of an OCES type 2 diabetes prevention program. "Not Interested At All" and "Not Interested" were categorized as "disinterest" and "Interested" and "Very Interested" were categorized as "interest". Regarding interest in weighing in-facility and keeping records, 11% expressed perceived constituent disinterest, 47% expressed perceived constituent neutrality, and 42% expressed perceived constituent interest; 18% of Educators expressed disinterest, 42% responded "neutral," and 40% expressed interest. Perceived constituent interest in keeping a food record or food group record was as follows: 8% expressed perceived disinterest, 54% expressed perceived neutrality, and 38% expressed perceived interest. Educator interest in reviewing these records included 14%

disinterest, 32% neutrality, and 55% interest. Responses for perceived constituent interest in different types of physical activity were as follows: 8% disinterest, 34% neutrality, and 58% interest. Educator interest in answering questions about different types of physical activity included 8% disinterest, 24% neutrality, and 69% interest. Perceived constituent interest in keeping a physical activity record included 11% disinterest, 45% neutrality, and 45% interest. Educator interest in reviewing and discussing physical activity records included 11% disinterest, 38% neutrality, and 52% interest. Regarding perceived constituent interest in food demonstrations, 8% expressed disinterest, 8% neutrality, and 84% interest. Educator interest in providing food demonstrations was 8% disinterest, 8% neutrality, and 84% interest.

Table 6 shows response frequencies for questions regarding potential lesson topics for a specific OCES DPP. Educators expressed 94% interest in “What is pre-diabetes”. Educators expressed 95% interest in type 2 diabetes prevention education, 83% interest in type 2 diabetes complications, 94% interest in healthy weight management and weight loss, 92% interest in realistic weight loss goals, 94% interest in food and physical activity balance, 92% interest in MyPlate education, 97% interest in portion sizes, 91% interest in increasing fruits, vegetables, and whole grains, 91% interest in reducing fats and added sugars, 95% interest in food preparation and recipe modification, 89% interest in understanding cues and triggers to emotional eating, 86% interest in identifying and overcoming barriers to healthful eating, 97% interest in healthful eating out, 94% interest in introducing physical activity and its benefits, 89% interest in types and amounts of physical activity, 89% interest in identifying and overcoming barriers to physical activity, 80% interest in physical activity safety, 80% interest in decreasing sedentary activities, 95% interest in staying motivated, 92% interest in managing stress, 83% interest in identifying and dealing with negative self-thoughts, and 95% interest in family support and knowledge. Only two topics received disinterest by one participant—understanding healthy weight management and weight loss, and realistic weight loss goals.

Table 5. Possible Components of an Oklahoma Cooperative Extension Service (OCES) Type 2 Diabetes Prevention Program (DPP).

Questions Regarding Program Components	Interest ¹				
	Not Interested At All	Not Interested	Neutral	Interested	Very Interested
	n (%)	n (%)	n (%)	n (%)	n (%)
Constituent interest in weighing at facility and keeping records	0 (0%)	4 (11%)	18 (47%)	16 (42%)	0 (0%)
Educator interest in weighing constituents, keeping records, and discussing progress	0 (0%)	7 (18%)	16 (42%)	12 (32%)	3 (8%)
Constituent interest in keeping a food record or food group record	0 (0%)	3 (8%)	20 (54%)	14 (38%)	0 (0%)
Educator interest in reviewing and discussing food records or food group records	1 (3%)	4 (11%)	12 (32%)	18 (47%)	3 (8%)
Constituent interest in different types of physical activity	0 (0%)	3 (8%)	13 (34%)	22 (58%)	0 (0%)
Educator interest in answering questions about types of physical activity	0 (0%)	3 (8%)	9 (24%)	22 (58%)	4 (11%)
Constituent interest in keeping a physical activity record	0 (0%)	4 (11%)	17 (45%)	17 (45%)	0 (0%)
Educator interest in reviewing and discussing physical activity records	0 (0%)	4 (11%)	14 (38%)	15 (41%)	4 (11%)
Constituent interest in food demonstrations	0 (0%)	3 (8%)	3 (8%)	11 (29%)	21 (55%)
Educator interest in providing food demonstrations	0 (0%)	3 (8%)	3 (8%)	14 (37%)	18 (47%)

¹Percentages in a row may not total to 100 due to rounding.

Table 6. Lesson Topic Options for an Oklahoma Cooperative Extension Service (OCES) Type 2 Diabetes Prevention Program (DPP).

Lesson Topics	Interest ¹				
	Definitely No	No	Neutral	Yes	Definitely Yes
	n (%)	n (%)	n (%)	n (%)	n (%)
What is pre-diabetes?	0 (0%)	0 (0%)	2 (6%)	18 (51%)	15 (43%)
Type 2 diabetes prevention	0 (0%)	0 (0%)	2 (6%)	15 (42%)	19 (53%)
Type 2 diabetes its complications	0 (0%)	0 (0%)	6 (17%)	13 (36%)	17 (47%)
Understanding healthy weight management/weight loss	0 (0%)	1 (3%)	1 (3%)	17 (47%)	17 (47%)
Realistic weight loss goals	0 (0%)	1 (3%)	2 (6%)	19 (53%)	14 (39%)
Balancing food and activity	0 (0%)	0 (0%)	2 (6%)	18 (51%)	15 (43%)
Build a healthy plate (MyPlate)	0 (0%)	0 (0%)	3 (8%)	20 (56%)	13 (36%)
Portion sizes	0 (0%)	0 (0%)	1 (3%)	18 (51%)	16 (46%)
Increasing fruits, vegetables, and whole grains	0 (0%)	0 (0%)	3 (8%)	21 (58%)	12 (33%)
Reducing fats and added sugars	0 (0%)	0 (0%)	3 (8%)	17 (47%)	16 (44%)
Food preparation and recipe modification	0 (0%)	0 (0%)	2 (6%)	14 (39%)	20 (56%)
Understanding cues and triggers to emotional eating	0 (0%)	0 (0%)	4 (11%)	17 (49%)	14 (40%)
Identifying and overcoming barriers to healthful eating	0 (0%)	0 (0%)	5 (14%)	14 (40%)	16 (46%)
Healthful eating out	0 (0%)	0 (0%)	1 (3%)	12 (34%)	22 (63%)
Introduction to physical activity and its benefits	0 (0%)	0 (0%)	2 (6%)	22 (61%)	12 (33%)

Table 6 Continued...

Types and amount of physical activity	0 (0%)	0 (0%)	4 (11%)	22 (61%)	10 (28%)
Identifying and overcoming barriers to being physically active	0 (0%)	0 (0%)	4 (11%)	21 (60%)	10 (29%)
Physical activity safety	0 (0%)	0 (0%)	7 (20%)	18 (51%)	10 (29%)
Decreasing sedentary activities	0 (0%)	0 (0%)	7 (20%)	18 (51%)	10 (29%)
Staying motivated (overcoming slide backs in lifestyle change)	0 (0%)	0 (0%)	2 (6%)	15 (42%)	19 (53%)
Managing stress	0 (0%)	0 (0%)	3 (9%)	17 (49%)	15 (43%)
Identifying and dealing with negative self-thoughts	0 (0%)	0 (0%)	6 (17%)	16 (46%)	13 (37%)
Family support/knowledge	0 (0%)	0 (0%)	2 (6%)	20 (56%)	14 (39%)

¹Percentages in a row may not total to 100 due to rounding.

Open-ended questions pertained to additional session topics and any comments or questions the County Educators might have. One County Educator indicated interest in an explanation of insulin and its role, as well as education on overall health prevention (eyes, feet, etc.) in relation to type 2 diabetes. Eight Educators responded with comments or questions. Four Educators indicated concern over the number of sessions they thought their constituents would attend as well as concern over the CDC's DPP not being realistic for them due to time constraints. Two Educators indicated interest ("sounds good!" and "really interested"). One Educator asked if they could partner with another County Educator to make the program more practical. One Educator expressed concern about being able to reach their constituents at the correct time of their need as well as expressing a need for marketing materials.

CHAPTER V

DISCUSSION

Regarding choice of a diabetes prevention program, the County Educators did not indicate a strong disinterest for any of the programs. However, Educators did express a higher interest in either a modified DPP (75% interest) or an OCES DPP (85% interest) as compared to the certified DPP (40% interest) (Table 1 and Table 2). Similar results were observed regarding the perceived constituent interest in a diabetes prevention program. There was little perceived disinterest in the CDC's DPP, but there was a much higher perceived interest in a modified DPP or an OCES DPP.

The County Educators indicated they desired and thought their constituents would attend one-to-two sessions per month for a total of one to three months. The majority of Educators also indicated a sixty-minute session would be most favorable. Based upon this feedback, an OCES DPP would be a total of four-to-six sessions over a three-month period at most. This is consistent with the calculated total number of sessions in Table 4, with the majority being four (37%) to six (26%) total sessions. However, this is not a realistic length of time to accomplish the desired weight loss goals. Participants would need a much longer time frame in order to lose the recommended 5-7% body weight in a healthful way. Additionally, it takes time to make true behavioral modification changes.

The Need for a Longer Program

Although it does not appear to be desirable to the County Educators, and possibly their constituents, in order for the program to be effective, additional training or longer program length is necessary. The CDC's DPP consists of 16 weekly sessions and a minimum of 6 monthly sessions. The enrollment time for their program is 12 months (CDC, 2013c). Additionally, the modified group-based DPP program used in the YMCA pilot study lasted for 12 months (Ackermann et al., 2008). It is unrealistic to assume that Oklahoma participants could attain the same outcomes in one-fourth of the time (~3 months) it took in these two studies. Furthermore, recommendations for weight loss as advocated by the Academy of Nutrition and Dietetics include weight loss of one to two pounds per week (ADA, 2009). Three months may not be a realistic time frame to lose the recommended 5-7% body weight to decrease risk of developing type 2 diabetes.

One of the major goals of a diabetes prevention program is behavior change. As stated previously, behavioral modification through lifestyle education has shown to be more effective at producing favorable outcomes as compared to conventional education (Yamaoka and Tango, 2005). It takes time to modify behaviors and patterns of thought, and therefore an OCES DPP would need to be longer than three months.

Additional reasoning for a need for increased program length compared to County Educator preference is that the topics they were interested in cannot be adequately covered in four-to-six sessions. The Educators indicated interest ($\geq 80\%$ interest) for all twenty-three topics listed on the questionnaire. To fully educate participants on each topic, more sessions would be necessary. However, many topics could be shortened and combined, allowing for fewer than twenty-three sessions. Moreover, some topics would simply need to be left out. This would be up to the discretion of the specialist creating the curriculum based upon current knowledge and experience.

Following the development of the program, formative assessment would be imperative in order to make any necessary changes.

The Need for Additional Outside Contact

If an OCES DPP were to have fewer sessions than the certified CDC's DPP, additional contact outside of the sessions would be necessary in order to reinforce concepts or remind participants of ways to incorporate new behaviors discussed during sessions. This could be accomplished through the use of text messages. A study conducted by Patrick et al. (2009) found the use of personalized text messages resulted in a significant weight loss in four months compared to those who received education materials in the mail once a month. The intervention group was able to choose the number of texts received each day as well as the time of day received. Some text messages were tips, some reminders, and some questions that required a response. Each week, the content of the messages changed according to the topic for that week. Additionally, intervention group participants received brief monthly phone calls for questions and for monitoring progress (Patrick et al., 2009). Donaldson, Fallows, and Morris (2014) further support the use of text messaging as a tool for weight management because it is able to reach participants in real-time during daily life. They also purport that text messaging is a low-cost method that increases communication between educators and participants. In their study, they looked at the effectiveness of personalized text messages on weight, BMI, waist circumference, quality of life, and anxiety and depression for those enrolled in the 12-week Lifestyle, Eating and Activity Programme (LEAP) compared to those who did not receive text-messages in the LEAP. Participants in the intervention group were sent two text messages per week reminding them to send in fruit, vegetable and breakfast consumption, and steps per day. Based upon these responses, educators gave individualized advice and encouragement. At the end of the twelve weeks, those who received the personalized text messages attended significantly more group appointments; indicated satisfaction with the use of text-messages and its helpfulness in

maintaining or improving behaviors; and significantly decreased weight, BMI, and weight circumference compared to the control group (Donaldson, Fallow, & Morris, 2014). The concept of individualized text messages may not be feasible for the County Educators, but the use of mass text messages may. Although both studies included personalized text messages, the use of mass text messaging may be effective at increasing attendance, increasing adherence to behavior modification techniques discussed, as well as increasing completion of homework assignments. Using text message reminders may help participants stay on track during the longer times between program sessions than those who are in programs that meet weekly.

Another possible method of increasing communication and education outside of program sessions in order to better facilitate increased knowledge and behavior modification is the use of technology in the form of emails and the internet. As discussed above, not every topic that the County Educators expressed interest in can be included in the number of sessions they indicated. Additional information not discussed in sessions could be sent out via the mail or email. Furthermore, Internet programs such as the Super Tracker from ChooseMyPlate.gov could be used as a tool to more easily track activity or food intake. Emails could include supplementary information or include links to websites that included supplementary information. Because time would be limited in the sessions, the additional resources that are easily accessible could greatly benefit the participants.

A study conducted by Walker et al. (2010) looked at the effectiveness of tailored and generic print newsletter for facilitating continued behavior change twelve months after the Wellness for Women Project, a program aiming to increase physical activity and fruit and vegetable consumption and decrease saturated fatty acid consumption in rural women ages 50-79. The program consisted of two treatment groups—one that received tailored newsletters and one that received generic newsletters. Both groups received instructional videos for physical activity. Behavioral markers and biomarkers were taken at baseline (0 months) and at the end of the

intervention (12 months). Follow-up measurements were taken at 18 months and 24 months. Both interventions showed improvement in most of the outcomes, with the tailored newsletters having increased improvement over the generic newsletters for a few of the outcomes (Walter et al., 2010). Therefore, the use of newsletters, either generic or tailored, could be effective for increasing adherence to behavior modification.

Possible Programming Components

Regarding possible programming components, County Educators did not express significant disinterest for any of the components listed, such as weighing participants, reviewing food logs, reviewing physical activity logs, or providing food demonstrations. The highest expressed disinterest was 18% for weighing constituents and keeping weight records (Table 5). Because County Educators were not in opposition to adopting these components, the incorporation of food and activity logs in an OCES DPP is recommended in order to effectively facilitate behavior change. The use of these logs provides accountability for the participants, as they are more likely to be aware of their diet and exercise if they are required to record it (Donaldson, Fallows, & Morris, 2014; Korotitsch & Nelson-Gray, 1999; Qi & Dennis, 2000). Additionally, the incorporation of session weigh-ins is very important. This provides another incentive to incorporate the lifestyle changes taught, and it also provides encouragement and motivation for those who experience weight loss. A report by O'Neil and Brown (2005) evaluated the benefits of regular weighing. There have been studies with contradicting results, but O'Neil and Brown point out that these studies were conducted on healthy weight individuals or on participants that were given false scale readings. They purport that regular weighing increases weight loss as well as weight maintenance. They also contend that weighing provides accountability and a way to measure progress. Lastly, the County Educators responded with the highest personal interest and perceived constituent interest in food demonstrations than any other program component with

84% interest (Table 5). Including food demonstrations could attract participants to come as well as provide valuable education on healthful foods they could incorporate into their diet.

This high County Educator interest and perceived constituent interest in food demonstrations is another rationale for creating an OCES-specific diabetes prevention program. Food demonstrations are not allowed in the CDCs program. If County Educators were to implement the CDCs certified DPP, food demonstrations would not be included.

As discussed earlier, as well as discussed in current literature (Ackermann et al., 2008; Mason et al., 2011; Aguiar et al., 2014), the feasibility of the CDC's DPP regarding cost and time investment causes concern. The County Educators are responsible for many different education programs and cannot commit the amount of time to a diabetes prevention program required to meet with each participant individually. The use of group-based only education and discussion could be used to address this concern. This was shown to be just as effective at decreasing risk for type 2 diabetes in the YMCA pilot study (Ackermann et al., 2008). This would greatly decrease the time commitment for the County Educators, as well as decrease costs to the state.

Addressing Negative Perceptions

County Educators indicated their interest and their perceived constituent interest regarding number of sessions and program length. As discussed above, the indicated program length is not long enough for true behavior modification and healthful, meaningful weight loss. It is expected that County Educators may have negative attitudes towards a longer program with more frequent sessions. Negative perceptions would need to be addressed in training. It would be necessary to explain why the program must be longer and include more sessions despite disinterest in the program being formatted that way. By explaining the necessity of the length and increased number of sessions, negative attitudes and perceptions may be changed and willingness to participate may increase.

In addition to addressing negative attitudes during training, formative assessment of the program would need to be conducted during training. This assessment should be conducted before training, after training, and again after a pilot session. County Educator feedback on curriculum formatting and educational content would be imperative in order to address any possible issues or misunderstandings. This would allow for the program to be tailored to the specific needs of both the constituents and County Educators, as well as create an environment in which education and change can occur.

A diabetes prevention program adopted by the County Educators in Oklahoma needs to meet the preferences and willingness of constituents, but also needs to include the educational and behavioral components needed in order to be effective at behavior modification and diabetes prevention. This formative assessment along with future program-specific assessments would allow for the program to best meet both constituent preferences and educational needs.

CHAPTER VI

CONCLUSION

Based upon the feedback provided by County Educators and the literature discussed, the recommendation for implementing a diabetes prevention program in Oklahoma would be an OCES-specific diabetes prevention program. Additionally, it is recommended that the OCES DPP occur over a 6-month (24 week) period of time. This could be accomplished by either eight 1.5-hour sessions every three weeks or twelve 1-hour sessions every two weeks. One hour appears to be too short of time to accomplish all that was indicated by interest in the questionnaire. Therefore, the program would require more sessions in order to adequately cover all of the lesson topics and program components. Ideally, a format of twelve 1.5-hour sessions would best accomplish weight monitoring, discussion, and adequate instruction. However, this increased number of sessions and session length would most likely deter constituents from enrolling as indicated by both questionnaire questions and open comments. The increased number of total sessions (8-12) compared to County Educator feedback (4-6) would allow for more topics to be covered, as well as for cooking demonstrations to be included. Furthermore, the increased face-to-face visits would increase the likelihood of behavior change. This 6-month time frame would also allow for meaningful weight loss to occur in a healthful manner.

Regarding program formatting, it is recommended to incorporate food logs, activity logs, and on-site weighings to increase the responsibility and accountability of participants. As stated earlier, this allows for the participants to take responsibility for their weight loss and provides immediate feedback of progress or regression. This self-monitoring is essential for true behavior modification.

It is recommended the program be implemented in a group-based manner to maximize the session length and the time of the County Educator, as well as provide opportunities for group discussion and accountability. Furthermore, it is recommended each session incorporate several of the topics of interest instead of only choosing eight or twelve topics to discuss. By combining the topics, more could be taught and discussed to bring about behavior change. Additionally, one or two cooking demonstrations are recommended to be incorporated into the program due to high County Educator interest and perceived constituent interest.

Further, recommendations are to use some sort of communication between sessions as well as post-intervention in order to remind the participants of key concepts, strategies, or behaviors discussed in the program. This could be accomplished through the use of paper newsletters, emails, or text messages. The use of this communication could further explain topics discussed in sessions or to introduce new concepts that could not be discussed during sessions due to time constraints. The efficacy of these newsletters, emails, or text messages would need to be evaluated following the pilot study if incorporated into the program curriculum.

Last, it is recommended that formative assessment be conducted once the program is designed in order to ensure the feasibility for our County Educators and constituents as well as to ensure the efficacy of the program for education and behavior modification. The goal is to create a program that will attract Oklahoma constituents to enroll and that will best meet their education and behavior needs to decrease their risk of type 2 diabetes.

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APPENDICES

APPENDIX A

Formative Assessment of Oklahoma Cooperative Extension Service County Educators Regarding Type 2 Diabetes Prevention Programming

The purpose of this study is to gain feedback on the interest of Oklahoma Cooperative Extension Service (OCES) Family and Consumer Sciences (FCS) County Educators regarding offering the CDC's Diabetes Prevention Program (DPP) in a certified or modified (non-certified) manner. Additionally, it is to gain feedback on the interests of OCES FCS County Educators regarding the development of an OCES type 2 diabetes prevention program. **Completing this survey does not commit you to conducting type 2 diabetes prevention programming.**

For the following questions, please indicate the responses that reflect your opinion and your knowledge of the citizens you serve. By completing this survey, we will gain a better understanding of your needs and interests. This is the first step in developing education strategies to improve the health of Oklahoman's at risk of developing type 2 diabetes.

Questions regarding the CDC's DPP Program	Not Interested At All	Not Interested	Neutral	Interested	Very Interested
1. After the brief explanation of the CDC's Diabetes Prevention Program including certification standards, expectations of the educators, expectations of the participants, and overview of the material, how interested are you in being educated in the program in order to become a certified DPP provider?					
2. How interested do you think your constituents would be to enroll in a certified CDC DPP program?					
3. If you are not interested in being certified, how interested would you be to offer the DPP program in a modified manner?					
4. How interested do you think your constituents would be to enroll in a modified CDC DPP program?					

Questions regarding an OCES type 2 diabetes prevention program	Not Interested At All	Not Interested	Neutral	Interested	Very Interested
5. How interested would you be to offer a type 2 diabetes prevention program developed specifically for OCES?					
6. How interested do you think your constituents would be to enroll in a type 2 diabetes prevention program developed specifically for OCES ?					

Questions regarding an OCES type 2 diabetes prevention program	0	1	2	3	4+
7. How many sessions/lessons do you think your constituents would realistically attend per month?					
8. Based upon the number of sessions/lessons a month indicated above, how many months do you think your constituents would realistically attend?					

Question regarding an OCES type 2 diabetes prevention program	30 min.	45 min.	60 min.	90 min.	120 min.
9. How long do you think each session/lesson should last?					

Questions regarding an OCES type 2 diabetes prevention program	Not Interested At All	Not Interested	Neutral	Interested	Very Interested
10. How interested do you think your constituents would be to weigh at your facility and keep records of their progress?					
11. How interested would you be to weigh your constituents at your facility, keep records of their progress, and discuss progress with your constituents?					
12. How interested do you think your constituents would be to keep a food record or food group record?					
13. How interested would you be to review food records or food group records and discuss them with your constituents?					
14. How interested do you think your constituents would be to engage in different types of physical activity?					
15. How interested would you be to discuss and answer questions about different types of physical activity?					
16. How interested do you think your constituents would be to keep a physical activity record?					
17. How interested would you be to review physical activity records and discuss them with your constituents?					
18. How interested do you think your constituents would be in food demonstrations?					
19. How interested would you be in providing food demonstrations to your constituents?					

20. Please indicate which of the following topics you would like included in an OCES type 2 diabetes prevention program.					
Topics	Definitely No	No	Neutral	Yes	Definitely Yes
What is pre-diabetes?					
How do I prevent type 2 diabetes (weight loss and physical activity)?					
Why is it important to prevent type 2 diabetes (type 2 diabetes and diabetes complications)					
Understanding healthy weight management/weight loss					
Realistic weight loss goals					
Eating the right amount of calories (balancing food and activity)					
Build a healthy plate (MyPlate)					
Enjoy your food but eat less (portion sizes)					
Increasing fruits, vegetables, and whole grains					
Reducing fats and added sugars					
Food preparation and recipe modification					
Understanding cues and triggers to emotional eating					
Identifying and overcoming barriers to healthful eating					
Healthful eating out					
Introduction to physical activity and its benefits					
Types and amount of physical activity					
Identifying and overcoming barriers to being physically active					
Physical activity safety					
Decreasing sedentary activities					
Staying motivated (overcoming slide backs in lifestyle change)					
Managing stress					
Identifying and dealing with negative self-thoughts					
How can my family support me? What do they need to know?					

21. Additional topics not listed here (open response)

22. Do you have any other questions or comments?

APPENDIX B

Oklahoma State University Institutional Review Board

Date: Thursday, April 17, 2014
IRB Application No HE1432
Proposal Title: Formative Assessment of Oklahoma Cooperative Extension Service County Educators Regarding Type 2 Diabetes Prevention Programming

Reviewed and
Processed as: Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 4/16/2017

Principal
Investigator(s):

Ashley Treas	Janice Hermann
301 HS	301 HES
Stillwater, OK 74078	Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☐ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,



Shelia Kennison, Chair
Institutional Review Board

Study Introductory Script

Thank you for coming to the Dining with Diabetes in-service and for your willingness to listen to our additional presentation on type 2 diabetes prevention and the CDC's Diabetes Prevention Program (DPP). We are considering implementing this program in a certified or modified manner or developing an Oklahoma Cooperative Extension Service (OCES) type 2 diabetes prevention program as part of the OCES Family and Consumer Science curriculum. In order for us to implement a program most suitable to you, the County Educators, and to your constituents, we would like to ask you to participate in a formative assessment study.

We are handing out a "Participant Information" sheet, which you may keep, describing the study. Please note there are information contacts at the bottom of the sheet if you have any questions.

Participation in this study will involve completing a formative assessment questionnaire following a type 2 diabetes prevention program presentation (*hold up questionnaire*). As we pass out the questionnaire, I would like to explain a few points:

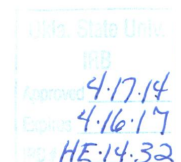
- Please note your name is not recorded on the questionnaire and therefore, all information is anonymous.
- Next there are 22 questions. Please answer all of these to the best of your knowledge.
- Note that there are two open-ended questions, questions 21 and 22, for you to give your feedback.

You may skip any question you do not wish to answer, but we encourage you to answer them so that we can get a comprehensive understanding of your needs. We estimate it will take you about ten to fifteen minutes to complete the questionnaire.

There are no risks associated with this study greater than those ordinarily encountered in daily life.

Your participation in this formative assessment is voluntary. Turning in your completed questionnaire indicates your willingness to participate in this study.

Does anyone have any questions?



**PARTICIPANT INFORMATION
OKLAHOMA STATE UNIVERSITY**

Title: Formative Assessment of Oklahoma Cooperative Extension Service County Educators Regarding Type 2 Diabetes Prevention Programming

Investigator(s): Janice Hermann, Ph.D., R.D./L.D., Professor and Oklahoma Cooperative Extension Service Adult and Older Adult Nutrition Specialist and Ashley Treas, B.S., Nutritional Sciences, Department of Nutritional Sciences graduate student, Oklahoma State University.

Purpose: The purpose of this study is to gain feedback on the interest of Oklahoma Cooperative Extension Service (OCES) Family and Consumer Sciences (FCS) County Educators in offering the CDC's Diabetes Prevention Program (DPP) in a certified or modified (non-certified) manner. Additionally, it is to gain feedback on the needs and interests of OCES FCS County Educators regarding the development of an OCES type 2 diabetes prevention program.

What to Expect: Participation in this study will involve listening to a presentation on type 2 diabetes prevention and the CDC's Diabetes Prevention Program and completing a formative assessment questionnaire following the presentation. The questionnaire should take about 10 to 15 minutes to complete and you are not required to answer any questions that you do not wish to answer.

Risks: There are no risks associated with this study which are expected to be greater than those ordinarily encountered in daily life.

Benefits: This assessment will help us to determine the needs and interests of the County Educators regarding type 2 diabetes prevention programming in order implement a program most suitable to the needs and resources of both the County Educator and constituents.

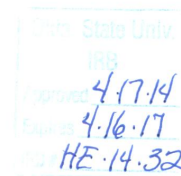
Compensation: There is no compensation for completing the program evaluation survey.

Your Rights: Your participation in this study is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this study at any time, without penalty.

Confidentiality: Your name is not collected on the formative assessment questionnaire and therefore, your answers are anonymous. We will be analyzing the data from the formative assessment questionnaire as a whole.

Contacts: You may contact Janice Hermann, Oklahoma Cooperative Extension Service Adult and Older Adult Nutrition Specialist, 301 Human Sciences, Department of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078, 405-744-4601 should you desire to discuss your participation in the study and/or request information about the results of the study. If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu

If you choose to participate: Turning in your completed formative assessment questionnaire indicates your willingness to participate in this study.



VITA

ASHLEY MICHELE SMITH

Candidate for the Degree of

Master of Science

Thesis: FORMATIVE ASSESSMENT ON THE NEEDS OF OKLAHOMA
COOPERATIVE EXTENSION NUTRITION EDUCATORS REGARDING
TYPE 2 DIABETES PREVENTION PROGRAM

Major Field: Nutritional Sciences

Biographical:

Education:

Completed the requirements for the Master of Science in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in July, 2015.

Completed the requirements for the Bachelor of Science in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in December, 2013.

Experience:

Restaurant Summer Intern, Chesapeake Restaurants, Oklahoma City, Oklahoma, May-August 2012; Medical Scribe, Lakeside Women's Clinic, Oklahoma City, Oklahoma, May-August 2013; Student Tutor and Front Desk Secretary, LASSO Center, Stillwater, Oklahoma, 2012-2014; Graduate Teaching Assistant, Oklahoma State University, Stillwater, Oklahoma, 2014-2015.

Professional Memberships: Academy of Nutrition and Dietetics (AND)