An outcomes study of diabetes education

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AN OUTCOMES STUDY OF
DIABETES EDUCATION

by

Tara McGill

Bachelor of Science
Michigan State University
1995

A thesis proposal submitted in partial fulfillment
of the requirements for the degree of

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ABSTRACT

An Outcomes Study of the Effectiveness of Diabetes Education

by

Tara McGill

Dr. Susan Michael, Examination Committee Chair
Professor of Nursing
University of Nevada, Las Vegas

The purpose of this study was to evaluate the effect of a twelve-hour diabetic education program on self-care behaviors and level of integration of diabetes in patients with type 1 & type 2 diabetes. Using the Theory of Integration (Hernandez, 1995) as the study’s conceptual framework, an outcomes study was conducted. Thirty-five questionnaires were distributed to subjects at the initial class of the diabetes education program, with 22 being able to be utilized for analysis.

The results of this study showed that there was a significant increase in the level of integration of diabetes ($t(21) = 2.998, p<.005$). When individual statements of integration were assessed, three areas were found to have a significant increase. These included, understanding how diabetes affects one’s body by living with diabetes.
(t(21) = 2.890, p,.005), being aware of bodily cues that distinguish blood glucose levels
(t(21) = 2.822, p.005), and knowing more about taking care of one’s diabetes more than
anyone (t(21) = 3.044, p.005).

Analysis of individual statements of self-care behavior included significant
changes in eating the foods according to a diabetes meal plan (t(22) = 2.802, p.005),
eating snacks at the right time of day (t(21) = 3.049, p<.005), knowing how to treat a
hypoglycemic reaction (t(22) 3.323, p<.005) and carrying a sugar source to treat those
hypoglycemic reactions (t(22) = 3.045, p<.005). Significant increases were also noted in
the logging of blood glucose results (t(22) = 3.239, p<.005), and in obtaining the amount
of exercise needed for diabetes (t(22) = 3.023, p<.005). This study is an important initial
evaluation of the effects of a diabetes education program on diabetes patients’ self-care
behaviors and level of integration.
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CHAPTER I

INTRODUCTION

Diabetes, by virtue of the high prevalence and numerous complications associated with it, accounts for a considerable share of total health care expense in the United States (American Association of Diabetes Educators, 1999). It is estimated that 92 billion dollars a year is spent on the health care of diabetes, with 60% being spent on acute care and long term complications (AADE, 1999). The expense of treating diabetes will continue to rise as the prevalence of diabetes continues to increase rapidly in the United States (Mokdad, Ford, Bowman, Nelson, Engelgau, Vinicor, & Marks, 2000). Efforts are being made to find ways to decrease the cost of diabetes through the development of new medications, research and maintaining glycemic control with patient self-management of diabetes. Currently the question revolving around diabetes management is how can patient self-management of diabetes be best achieved. Steps are being taken to find ways to evaluate this through examining existing programs of diabetes education and trying to identify what outcomes are produced. Educational outcomes are being looked at as a possible key factor in decreasing the cost of diabetes and preventing or slowing down secondary complications. Research must be conducted to further understand how education impacts the maintenance, control, outcomes and secondary complications of diabetes.
Problem

Diabetes is a chronic illness that costs billions of dollars each year, and the cost continues to escalate. Educational programs have been developed throughout the country to assist diabetic patients in controlling their diabetes. Through education and close monitoring of blood glucose levels, it is believed complications will decrease which will subsequently decrease cost of care. Many of these programs have been recognized by the American Diabetes Association and thus are expected to meet certain criteria. However, despite the recognition of many diabetes education programs by the American Diabetes Association, little research has been conducted to document the effect of the program’s outcomes. The majority of research that has been conducted covers pharmaco-efficacy trials, cost efficacy, social support, knowledge levels, metabolic control, nutritional influence, and exercise influence. The focus of research is now changing to examine the outcomes of diabetes education.

Purpose of the Study

The purpose of this study is to evaluate the effect of a twelve-hour diabetic education program on self-care behaviors and level of integration of diabetes in patients with type 1 & type 2 diabetes. Assessing the educational impact upon people with diabetes is important because it will provide practitioners with information regarding the efficacy of diabetes education in assisting patients with diabetes to control their illness.
Significance

Despite the increasing amount of resources provided to comprehensive outpatient diabetes education programs, evaluations have provided little compelling evidence of the benefits of such programs on glycemic control (Peyrot & Rubin, 1994). Previous studies (Sullivan & Joseph, 1998 & Peyrot & Rubin, 1994) support the idea that education facilitates health promoting behavior and improves the knowledge level of diabetes, but that it has been difficult for clients to maintain the changes after the education program has finished. Sullivan and Joseph (1998) suggest that further research be conducted to develop valid and reliable measurements of knowledge of diabetes, skills for diabetes and self-care behaviors for effective diabetes management. This study will be an initial examination of the impact that an educational program can have on patients’ ability to control their diabetes.
CHAPTER II

LITERATURE REVIEW

Introduction

Diabetes is a chronic disease that is posing a serious public health problem, with an estimated 16 million Americans currently diagnosed with diabetes (Centers for Disease Control and Prevention, 1999). Management of diabetes occurs through educational programs where individuals with diabetes collaborate in a self-management program with their primary care providers. Despite the increasing commitment of resources to diabetes education, evaluations of these programs in their effectiveness to assist patients with good glycemic control have not been done (Peyrot & Rubin, 1994). This chapter will review the physiological and economical impact of diabetes, supporting that good glycemic control decreases complications. It will emphasize the effect that self-care behaviors and behavior change have on diabetes management. It will also discuss current diabetes education research and demonstrate that further research is necessary on this topic.

Impact of Diabetes

Diabetes and its complications occur in people of all ages, race and ethnic groups nationwide, imposing national health care and economic concern. "Individuals who
have diabetes in the United States include 4.2 million women, 3.3 million men, 127,000 children, and 3.2 million adults 65 years of age and older” (A.A.D.E., 1999). More than 620,000 individuals are diagnosed yearly with diabetes in the United States, 20,000 of which are type 1 and 600,000 which are classified as type 2 (Mazze, Bergenstal & Ginsbergo, 1994). These individuals diagnosed with diabetes, join the other 8 million undetected cases, making diabetes the seventh leading cause of death in the United States and contributing to more than 193,000 deaths each year (Satcher, 1999). Recently it has been reported that there has been a 70% increase in diabetes in the age group of 30-40 years over the last decade (Mokdad et. al, 2000).

Long-term microvascular and macrovascular complications resulting from diabetes include retinopathy, nephropathy, neuropathy and cardiac and peripheral vascular disease. All of these complications contribute to the mortality record of diabetes. The economic burden of diabetes escalates each year with the cost of health care and lost days of work estimated at $92 billion a year, with 60% being spent on acute care and long term complications of diabetes (AADE, 1999). Public concern and health care costs will only increase with the steady rise of individuals diagnosed with diabetes yearly, further intensifying the burden for families and communities with the loss of people’s lives and abilities.

Pathophysiology of Diabetes Mellitus

Diabetes mellitus is a chronic illness characterized by hyperglycemia resulting from a destruction of pancreatic islet B cells, insulin resistance in peripheral tissues, and/or an abnormality in insulin secretion. Insulin, which is secreted by the pancreas, is a
vital hormone involved in the uptake of glucose into cells to produce energy, to store fat and to synthesize protein. Type 1 diabetes has been identified as immune and nonimmune mediated and accounts for about 10% of all diabetes mellitus in the western world (American Diabetes Association, 1999 & McCance, Huether, 1998). Immune-mediated diabetes results from a cellular-mediated autoimmune destruction of the B-cells of the pancreas, whereas the nonimmune has no known etiology (The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, 1997). Onset of type 1 diabetes is usually juvenile with the age span going to as late as 40 years, and the peak incidence occurring around age 14. This type of diabetes is characterized by normal or below normal body weight, with a rapid onset marked by polyuria, polydipsia, polyphagia and severe hyperglycemia (Mazze, Bergenstal & Ginsberg, 1994). The more prevalent category of diabetes is type 2, which primarily affects those greater than 40 years of age and whom are obese. (ECDCDM, 1997; McCance & Huether, 1998). This type is usually a slow progression resulting in impaired insulin secretion or insulin resistance. Treatment may range from daily exercise and diet change to oral hypoglycemic agents and insulin injections. This type of diabetes has a strong genetic disposition, and occurs more frequently in women with gestational diabetes, people with hypertension, and varies in racial/ethnic groups.

Glycemic Control

The emphasis for glycemic control is fueled by the continual push for health care cost reduction. In trying to comply with these standards and achieve glycemic control, conventional diabetes education programs have been created to promote client adherence.
to a diabetic regimen (Hernandez, 1995; Schrock, 1998). With the annual cost of treating diabetes being estimated at one hundred billion dollars per year, which is over two and a half times the amount of treating nondiabetics, it is no wonder there is such a push for improving the performance of these programs (Eastman, Javitt, Herman, Dasbach, Cofley-Merriman, Majer, Dong, Manninen, Zbrozek, Kotsansos, Garfield & Harris, 1997; Selby, Ray, Cloby & Zhang, 1997). Due to the chronic nature of diabetes and the multiple systems that can be effected, it is imperative to prevent acute complications and to reduce the risk of long term complications through continuing medical care and education (American Diabetes Association, 1996). Although there is no cure for diabetes, it has been found that good glycemic control decreases secondary complications. The goal for practitioners becomes how to most effectively intervene with patients with diabetes to attain and maintain glycemic control.

Normal blood glucose levels are 110 mg/dl or lower for fasting blood glucose and less than 6.05% for HbA1c (ADA, 1999). However, for the person with diabetes, the American Diabetes Association recommends that the HbA1c remains less than 7% as a treatment goal of near normoglycemia (ECDCDM, 1997). In order to obtain the goal of HbA1c <7%, an attempt should be made to keep the average blood glucose within the range of 70-150 mg/dl (Brewer, Chase, Owen & Garg, 1998). Experts have shown that benefits can be attained from maintaining near normoglycemia levels, and that higher rates of complications and greater health care costs due to secondary complications can occur in people with type 1 & type 2 diabetes whose HbA1c levels exceed 10% (Eastman et al., 1997).
Recently there have been two landmark longitudinal studies that have impacted the way practitioners monitor, treat and make decisions about diabetes mellitus. These two studies both found that tight glycemic control of people with type 1 and type 2 diabetes can significantly reduce the severity and rapid onset of secondary complications from diabetes. The first study, The Diabetes Control and Complications Trial (DCCT), was a trial design that used 1441 people, ages 13 to 39, with type 1 diabetes with an absence of hypertension, hypercholesterolemia and severe diabetic complications or medical conditions from 29 diabetic centers from 1983-1989 (The Diabetes Control and Complications Trial Research Group, 1993). There were two groups within the study, the conventional therapy group consisting of 730 subjects and the intensive therapy group with 711 subjects. The conventional therapy group was treated with one or two daily insulin injections and no daily insulin adjustments. The goal of this group was of clinical well being and the absence of symptoms of hyperglycemia. The intensive therapy group was treated with three or more daily insulin injections or an insulin pump, with insulin dosages being adjusted according to the results of self-monitored of blood glucose levels performed at least four times per day, dietary intake, and anticipated exercise (DCCT, 1993). The goal of this group was the normalization of blood glucose (ADA, 1999). The results of the study showed that “intensive therapy of patients with type 1 diabetes mellitus delays the onset and slows the progression of clinically important retinopathy, including vision-threatening lesions, nephropathy, and neuropathy, by a range of 35 to more than 70 percent” (DCCT, 1993 p. 983). Due to these findings, “in June 1993, after an average follow up of 6.5 years (range 3 to 9), the independent data monitoring committee determined that the study results warranted terminating the trial” (DCCT,
1993, p. 978). The American Diabetes Association (1999) believed that this study was both statistically and clinically significant, further supporting the independent data monitoring committee’s decision for terminating the study.

The second research project that brought about landmark results was the United Kingdom Prospective Diabetes study, which studied 5,102 patients that were newly diagnosed with type 2 diabetes. This randomized clinical trial included over 23 different diabetes centers within the United Kingdom between 1977 and 1991. This study compared the effects of an intensive treatment policy with four pharmacological monotherapies, versus a diet control group, on the cardiovascular and microvascular complications of type 2 diabetes (ADA, 1999). The study had a three part purpose; 1) to assess whether lowering blood glucose levels would be beneficial by reducing secondary complications, 2) to assess the advantages or disadvantages of insulin and sulfonylurea drugs (chlorpropamide, glyburide and metformin) and 3) to examine the benefits of lowering blood pressure. A fourth and smaller part to the study was also evaluated. This area assessed the advantages and disadvantages of ACE inhibitors and Beta-blockers in treating hypertensive type 2 individuals with diabetes. The UKPDS results showed a significant reduction of retinopathy, nephropathy, and possibly neuropathy by 25% with intensive therapy lowering HbA1c to 7.0% compared to the conventional group of HbA1c of 7.9%. Also the data showed a continuous relationship between the risks of microvascular complications and glycemic levels, such that for every percentage point decrease in HbA1c (e.g. 9 to 8%), there was a 35% reduction in the risk of complications (ADA, 1999). In relation to hypertension, the study showed that decreasing blood pressure levels to 144/82mmHg reduced strokes, heart failure, microvascular
complications, diabetes related deaths and visual loss. As to which drug was better at lowering blood pressure, ACE Inhibitors vs. Beta-blockers, both were equally effective in this study. There were no significant findings that intensive therapy reduced the risk of cardiovascular complications (e.g. myocardial infarctions) compared to the conventional therapy of lowering blood glucose (ADA, 1999). The result that there was no significant differences between the drugs being studied is slightly skewed due to the limitation of a large frequency of drug crossovers and additions of secondary drugs that took place in order to achieve a certain blood glucose level. Overall, this study confirms previous results that lowering blood glucose would be beneficial.

Knowing that tight glycemic control will decrease secondary complications, people with diabetes are faced with the task of implementing daily treatment regimens that are even more rigid than those followed in conventional therapy. To achieve tight control in the DCCT study, patients administered three or more insulin injections daily with an adjusted dosage according to self-monitored blood glucose levels. Other areas that needed to be modified in order to achieve tight control were self-care behaviors, such as physical activity, dietary intake, exercise, and skin/foot care.

Self-Care Behavior

People with diabetes are responsible for the self-management of their diabetes, since the majority of their life is spent outside of the hospital or physician’s office. Therefore, they face the task of making daily decisions concerning their diabetes care. In order to manage diabetes, a commitment to lifestyle change to incorporate new self-care behaviors is needed. Frey and Denyes (1989) state that self-care comprises the actions...
that individuals initiate on their own behalf to maintain life, health, and well being. These actions are a way in which people direct themselves towards primary prevention and health promotion. Such activities that must be followed to control diabetes include dietary intake, physical activity, medication administration, skin/foot care, and monitoring of glucose levels, all of which can be difficult lifestyle changes that require a considerable amount of knowledge.

Peyrot and Rubin (1994) conducted a study to examine the relationship between changes in self-care behavior and improvements in glycemic control over a 1 year period among 82 adult patients enrolled in a comprehensive outpatient diabetes education program. Data was obtained from glycosylated hemoglobin scores and self-reported diabetes management activities prior to and subsequently after the program. There were 48 (59%) participants with type 1 diabetes mellitus, and 51 (62%) with type 2. Analysis focused on the self-reported frequency of missing insulin shots, situational adjustment of insulin dosage, self-monitoring of blood glucose, and episodes of vigorous exercise (Peyrot & Rubin, 1994). Results indicated that 24% of the people did not improve in any self-care behaviors, 32% improved substantially in either exercise or self-monitoring of blood glucose, and 44% of the group had maximum improvement with 32% improving in insulin administration and 12% improving in both exercise and monitoring of blood glucose. "The results suggest that the majority of the observed improvement produced by the education program is due to improvements in three aspects of self-care: insulin administration, monitoring of blood glucose, and exercise" (Peyrot & Rubin, 1994 p.146). They noted that when there was no change in self-care behaviors, there was a small improvement in glucose control and a reduction of HbA1c less than 1.0. However,
when there was self-care behavior improvement, there was a substantial improvement in glucose control (Peyrot & Rubin, 1994). The people who improved in only exercise or glucose monitoring had a decrease in HbA1c between 1.0 to 1.5, while those that improved in both areas had a decrease of 2.6 in HbA1c. This study demonstrates that patients with diabetes and who improve in self-care behavior, can expect improvements in glycemic control.

Blaum, Velez, Hiss and Halter (1997) conducted another study that supports the idea that metabolic control is dependent on self-care behavior. These researchers found clinical characteristics related to poor glycemic control in people with type 2 diabetes. This study was a cross-sectional secondary data analysis that looked at 393 patients with type 2 diabetes and evaluated their glycemic control, their self-care practices and psychosocial adjustment. It was found that poor self-care ability was significantly related to poor glycemic control, and that patient self-care concerns and physician management behaviors may be important to improving glycemic control for some patients with type 2 diabetes.

People with diabetes are expected to make multiple self-care behavior changes in a short period of time, which are complex in nature and require a great deal of knowledge in order to carry them out correctly. Sullivan and Joseph (1998) conducted a study to gain an in-depth understanding of the client’s response to lifestyle change expectations. This qualitative study consisted of 10 people age’s 47-77 years with type 2 diabetes. Subjects were asked to answer questions in a telephone survey and to attend a videotaped focus group. Subjects were asked about transition of behavior changes that they have made and whether they were easy, difficult or impossible. Further they were asked about
self monitoring of glucose and "whether self-monitoring changed the way they cared for themselves and specifically, if they made changes in diet and/or activity in response to a blood glucose reading" (Sullivan & Joseph, 1998 p.73). Those subjects that answered no to self-monitoring were then asked why. The transcripts and tapes were reviewed by the researchers and by two independent nationally known nurse researchers with expertise in qualitative research. The results of the study found that most of the participants, despite intellectual understanding of rationale and recognizing the positive effect on blood glucose, had difficulty in maintaining diet and exercise (Sullivan & Joseph, 1998). Participants supported the concept that knowing does not necessarily result in doing, and that maintaining sustained self-care behavior is much harder than achieving short-term changes in behavior. This study gives support to the difficulty of changing self-care behaviors and demonstrates the need for further research on how to help people implement self-care behaviors for effective management.

**Behavior Change**

Throughout the diabetes literature there is a continuous exchange of terms or concepts to describe the regimen that patients follow in order to manage their diabetes. The first word to be used to describe this phenomenon was compliance, which became popular in the 1970’s. This word is prevalent in medical science and yet there are many quandaries that accompany the mere thought of labeling a person’s action by it. "In medical usage, compliance is defined as the extent to which a person’s behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice" (Lutfey & Wishner, 1999 p. 635). This word, though not
intended to, has turned into a negative connotation. It suggests that a patient must yield to or obey a physician's instructions, otherwise they will be considered noncompliant (disobedient, uncooperative, unreliable). Practitioners following this concept give patients the complex daily living routine for diabetes management and expect them to follow it, allowing the medical practitioners to be responsible for the decision making and control of the disease.

Chan & Molassiotis (1999) examined the relationship between diabetes knowledge and compliance among Chinese people with type 2 diabetes mellitus in Hong Kong. These researchers conducted a non-experimental cross-sectional study consisting of a convenience sample of 52 adults with type 2 diabetes that attended an out-patient diabetes clinic and assessed diabetes knowledge, compliance behaviors, condition of patients' feet and HbA1c levels. Compliance was assessed with the Compliance Behaviour Questionnaire, and knowledge was assessed with The Diabetes Knowledge Scale (DKN). The DKN scale consists of 15 multiple-choice questions that have a coefficient alpha of 0.80 (n = 237), with the content validity verified by experts in diabetes care. This questionnaire was translated into Chinese with some of its content changed to fit the different culture found in Hong Kong by a panel of experts. The mean content validity index from the Chinese version was 0.96, with 0.75 being satisfactory. The Compliance Behavior Questionnaire was originally done in Chinese, it is a two-part questionnaire with part I having 20 questions answered on a 5-point Likert scale, and part II requiring feet inspection. It looks at dietary and drug compliance, self-monitoring of blood glucose, foot care, exercise and management of hypoglycemia. Face and content validity was done by a panel of experts, and test-retest reliability was done with five
subjects at 2-week intervals, with the coefficient correlation being $r = 0.91$ (Chan & Molassiotis, 1999). The results of the study showed that there was no relationship between knowledge of diabetes and compliance, and that there was a gap between what the patients were taught and what they were actually doing (Chan & Molassiotis, 1999). The finding from this study confirmed previous research reporting that there is little compliance with lifestyle changes such as exercise and diet, and that knowledge is no guarantee of behavior change in patients with diabetes (Sullivan & Joseph, 1998).

A second term or concept used to describe whether or not the patient follows a diabetes regimen is adherence, which is routinely interchanged with compliance. Adherence is defined as “the extent to which a person’s behavior (medication-taking and lifestyle practices) coincides with medical or health advice” (McNabb, 1996 p. 213). Unlike the word compliance, adherence minimizes the authoritative practitioner-submissive patient model of health care (Lutfey & Wishner, 1999). Adherence has a much broader scope that allows for people to take a more active and willing role in their medical treatment. With adherence, patients are able to make independent decisions about self-care behaviors. “Self care in diabetes is fluid rather than static, and the regimen resembles more of a series of if-then statements rather than a standard medical prescription, allowing the patient to make complex treatment decisions for themselves” (McNabb, 1999 p.215). The primary goal of educational outcomes is the achievement of glycemic control. It is assumed that adherence is mandatory in order to reach glycemic control (Hernandez, 1999).

A study by Boyer et.al (1996) compared the relationship of adherence and glycemic control using 42 people with type 1 & type 2 diabetes mellitus. Glycemic
control was determined using glycosylated hemoglobin levels. The Physician’s Perception of Diabetes (PPDS) scale and the Subjects Perception of Diabetes Scale (SPDS) were utilized to determine physician-patient discordance. The PPDS assessed the endocrinologist’s perception of each patient based on four Likert type areas which included; severity of disease, cost or inconvenience of self-care behavior, expected immediate benefits of adherence (e.g., controlling acute hypoglycemic and hyperglycemic symptoms) and long-term benefits of adherence (e.g., controlling blood glucose, averting complications)(Boyer et al., 1996). Degree of discordance and direction were represented by numbers -4 to +4, with negative values representing patient > physician ratings, and positive values reflecting physician > patient ratings for each dimension (Boyer et. al, 1996). The Diabetes Regimen Adherence Questionnaire (DRAQ) was used to assess self-care behaviors and Glycosylated hemoglobin levels. The DRAQ is a 15-item self-reported instrument, which assesses the degree that self-care behaviors, such as foot care, exercise, blood sugar testing, diet, and insulin injections, are done by the patients. The frequency of a behavior is assessed on a 1-5 scale with a total summit of scores ranging from 15-75. High scores, such as a score of 75, indicate a behavior is being preformed frequently. An internal reliability for the DRAQ was reported to be 0.79 using Cronbach’s alpha.

This study demonstrated that disagreement on long-term benefits of adherence between physician and patient correlated with greater adherence by the patient. It also found that patients who underestimated the cost of adherence showed greater adherence to self-care regimens. No significant relationships were found for direction of discordance in perception of severity, immediate benefit of adherence or long-term
benefit adherence" (Boyer et al., 1996). No correlation was found with adherence and glycemic control.

Hernandez (1997) has suggested that the word integration may be more appropriate for diabetes and should replace adherence because integration is a collaborative alliance between primary care providers and clients, whom are seen as coexperts of their disease management. This term or concept was generated through grounded theory research of four individuals with type 1 diabetes. "A three-phase process of integration emerged as data from interviews, written papers about their diabetes, and self-report journals were analyzed" (Hernandez, 1995 p.19). Through further research, it was found that this theory could be used with people that have type 2 diabetes. Integration is defined as "an ongoing process in which the two selves (diabetic and personal) more fully merge to create an individual who is healthy, both mentally and physically" (Hernandez, 1995 p.18). Utilizing integration, primary care providers develop a collaborative alliance relationship with their patients and act as facilitators rather than authoritative dictators. Healthcare providers develop an initial set of guidelines and encourage patients to make necessary adaptations to accommodate it into their life. It is here that the client can make their own decisions about how to fit their disease into their lifestyle. Clients won’t have to worry about being labeled noncompliant if they haven’t been able to follow a ridged set of standards or goals.

Diabetes Education Research

Diabetes is a challenging disease due to its complex pathophysiological makeup. It causes chronic debilitating effects on persons of all ages, which ultimately leads to
increasing cost of health care. For these reasons, determining the impact of diabetes education on patients’ ability to control this disease becomes urgent. The idea of diabetes education before 1980 was considered to be of little value due to an inability to link knowledge-based interventions with behavior change and improved health outcomes (AADE, 1999). These interventions focused mostly on individuals who were hospitalized, furnished no follow up, and lacked guidelines and educational standards. Other problems that lead to the lack of knowledge of diabetes education impact were insufficient funding, inadequate research and failure to document intervention effectiveness.

Currently, there is a small amount of significant research that has been done which documents diabetes education outcomes (AADE, 1999). The majority of research that has been conducted covers pharmaco-efficacy trials, cost efficacy, social support, knowledge levels, metabolic control, nutritional influence, and exercise influence. Focus needs to be directed towards including a greater representativeness of patients, intervention agents, group vs. individualized studies, and to identify provider characteristics, attitudes, and to assess their contribution to outcomes (AADE, 1999).

Two landmark studies have recently been conducted and have impacted medical management of diabetes include the Diabetes Control and Complications Trial and the United Kingdom Prospective Diabetes Study. While both have left an impressionable mark, neither one addressed issues of educational methods. They have resolved some questions about diabetes management, such as the relationship of good glycemic control and complications, but left many unanswered questions about how patients were supported in their self-care practices, and what roles helped patients sustain near
normoglycemic levels over an extended period of time (AADE, 1999). Because of this, it will be hard, if not impossible to replicate these trials. The replicability of studies is important for the future of diabetes educational outcomes because the more interventions are validated and repeated with positive outcomes, then there is greater support that the findings could be generalized for widespread adoption into the diabetic regimen. Efforts need to be directed toward improving diabetes care and education in order that guidelines and educational programs may be developed.

Summary

"Although patient education has been effective in teaching patients about the technical portion of diabetes and its treatment, the best patient education efforts have not led to consistent, enduring behavior changes necessary for long-term blood glucose control and decreased morbidity" (Quackenbush, Brown & Duchin, 1996, p.236). Although studies such as the DCCT and the UKPD study have changed the medical management of diabetes, they did not provide educational outcome findings. Little was given in these studies as to how patients attained and maintained such good glycemic control, what type of social support was needed, what education was offered to the patients, and how this affected their outcomes. Most of the studies reported here, such as Sullivan & Joseph (1999) and Chan & Molassiotis (1999) show how an increase in knowledge may help achieve desired physiological outcomes, but information was not given on how to improve the standards for diabetes education.

It has been suggested that further research needs to be conducted to help establish criteria that will bring insight into unanswered questions pertaining to the health
maintenance of diabetes. Knowledge by itself has shown little influence to change a person’s behavior, but if complimented with other factors such as a change in diet or exercise, then glycemic control could be attained (Chan & Molassiotis, 1999, Peyrot & Rubin, 1994). With further research will come answers to questions like what type of program strategies are able to produce change in people resulting in behavior change (e.g., teaching, contracting, goal setting, curriculum) (AADE, 1999). Areas like these have the greatest need for further educational outcome evaluation to verify, identify and define when, how much, and what critical core knowledge and behavior is needed. Also, there is a need for assessing what provider characteristics are most beneficial for successful patient outcomes. This can include distinguishing what concept practitioners follow, that of compliance, adherence or integration. With compliance, a practitioner will tell a person what type of diabetic regimen they should follow. With adherence, subjects are able to have a more active roll in the decision making of their medical treatment, while integration forms a collaborative alliance between provider and subject, with the provider acting as the facilitator rather than an authoritative dictator.

This chapter has shown that there is growing urgency to decrease the secondary effects of diabetes mellitus. It has identified how the number of people diagnosed with diabetes each year is increasing and that glycemic control is the key to decreasing some of these effects. Although studies have shown that good glycemic control reduces complications, there are still unanswered questions as to what affect diabetes education has on the physiological outcomes of diabetes. This study will help evaluate the effect diabetes education programs have on self-care behaviors and integration of diabetes.
CHAPTER III

FRAMEWORK

Introduction

When a diagnosis of diabetes mellitus is made, a change of lifestyle is required in order to achieve glycemic control. There are various theories and concepts that explain how people make these changes. The theory of integration is a theory that explains this process and will be used to guide this study. This chapter will review the theory of integration by defining the concepts, variables and assumptions that accompany this theory. It will show the adequacy of using this theory as the framework in researching the questions that will be posed for this diabetes research project.

Integration

The theory of Integration provides the framework for this study because of its emphasis on self-care behavior changes resulting from an increase in knowledge and willingness to adapt. This theory emerged through a grounded study involving four individuals with insulin dependent diabetes (Hernandez, 1995). "A three phase process of integration emerged as data from interviews, written papers about their diabetes, and self-report journals were analyzed" (Hernandez, 1995 p. 19). Through further research, it was found that this theory was also appropriate for individuals with type 2 diabetes,
thereby providing a process to achieve glycemic control in patients with both type 1 and type 2 diabetes mellitus. Integration is defined as “an ongoing process in which the two selves (diabetic and personal) more fully merge to create an individual who is healthy, both mentally and physically” (Hernandez, 1995 p. 19). With in this theory, individuals can make their own decisions about how to fit their disease into their lives. Primary care providers act as facilitators rather than authoritative dictators of the diabetes regimen. An outline of the theory of integration can be seen in Table #1. This synopsis gives an overview of the process of integration from the point of having diabetes, to the emergence of the patient becoming the diabetes expert in the science of one phase.
Table 1
Conceptual Map

<table>
<thead>
<tr>
<th></th>
<th>Having Diabetes</th>
<th>Turning Point</th>
<th>Science of One</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selves'</td>
<td>Personal self is the focus. Diabetic self is regulated to a corner of one's life</td>
<td>Diabetic self is the focus</td>
<td>Merging of Selves</td>
</tr>
<tr>
<td>Focus/ Emphasis</td>
<td>Living life as prior to diabetes, “Being Normal”</td>
<td>Trying to learn as much as can about one’s own diabetes</td>
<td>Living life well with one’s own diabetes</td>
</tr>
<tr>
<td>Diabetes Knowledge</td>
<td>Lack of knowledge regarding diabetes. Many facts known, not connected into a level of understanding</td>
<td>More knowledge &amp; purposeful gain of diabetes knowledge</td>
<td>Deep level of diabetes Knowledge. Knowing of body &amp; how it but responds to diabetes</td>
</tr>
<tr>
<td>Glycemia</td>
<td>Poor control</td>
<td>Poor control</td>
<td>Good control</td>
</tr>
<tr>
<td>Relationship With Health Professional</td>
<td>Adherence (Passive)</td>
<td>Adherence (more active in following the regimen)</td>
<td>Collaborative Develop own way of living with diabetes</td>
</tr>
</tbody>
</table>

(table continues)
Table 1 (continued)

<table>
<thead>
<tr>
<th>Having Diabetes</th>
<th>Turning Point</th>
<th>Science of One</th>
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</thead>
<tbody>
<tr>
<td><strong>Lifeways</strong></td>
<td></td>
<td></td>
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<tr>
<td>Denying</td>
<td>Tuning in, Exercise,</td>
<td></td>
</tr>
<tr>
<td>Minimizing</td>
<td>Constant thinking</td>
<td></td>
</tr>
<tr>
<td>Normalizing</td>
<td>Spirituality</td>
<td></td>
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<tr>
<td><strong>Metaphors</strong></td>
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<tr>
<td>Fitting in,</td>
<td>Diabetes at work</td>
<td></td>
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<tr>
<td>Carrying on</td>
<td>Learning to live</td>
<td></td>
</tr>
<tr>
<td>Being to busy</td>
<td>Focusing on feelings</td>
<td></td>
</tr>
<tr>
<td>Going along with it</td>
<td>Juggling for control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taking care</td>
<td></td>
</tr>
</tbody>
</table>


Concepts

Integration

Integration is the basic social process that underlies the experience of living with diabetes, accounting for the changes and adjustments that occur over time following the diagnosis of diabetes (Hernandez, 1996). This experience of living with diabetes is a three-phase process, which includes having diabetes, the turning point, and the science of one (Table 1). Integration can be defined as “an ongoing process in which the two selves (diabetic and personal) more fully merge to create an individual who is healthy, both mentally and physically” (Hernandez, 1996 p. 42). The personal self is the person that
existed prior to the diagnosis of diabetes while the diabetic self is the new entity that came about and had to be dealt with once the diagnosis was made.

**Within the theory of integration, several lifeways (or actions) and metaphors (or themes) facilitate or inhibit the integration of the diabetic and personal selves.** Lifeways are defined as the characteristic patterns of thought or actions used without conscious knowledge, while metaphors of integration identify how adjustment is accomplished with life, towards diabetes, and how the diabetic and personal selves are integrated (C. Hernandez, personal communication, July 1999). Active metaphors and lifeways help facilitate change towards integration, while passive ones inhibit or prevent change, reflecting minimal integration of the diabetic and personal selves. (Hernandez, 1996, Hernandez, 1999). Some lifeways that promote integration are tuning in, exercise, constant thinking, and spirituality, while some active metaphors are: diabetes at work, learning to live with diabetes, focusing on feelings, juggling for control, and taking care (Hernandaz, 1999). Some of the passive lifeways as stated by Hernandaz are denying, normalizing, minimizing, while the metaphors are: fitting in, going along with it, carrying on, and being too busy for diabetes (1999). The metaphor for living acts as an all-encompassing lifeway, tying all of the lifeways together (Hernandez, 1996 p.47).

**Having Diabetes**

The having diabetes phase starts with the diagnosis of diabetes. This phase is characterized by the lack of knowledge about the disease, along with the overwhelming disinterest of involvement with its management. The primary focus in this stage is on the personal self, trying to live the same life prior to being diagnosed with the majority of effort being put towards being normal. Only limited time is spent on the diabetic regimen.
because most of the ownership/responsibility of diabetes is put on the health care professional. There is minimal acceptance and accountability taken for the disease management resulting in poor glycemic control. Lack of knowledge about diabetes "or piecemeal type of knowledge in which many diabetes facts may be known but are not connected in a meaningful way to form a deep understanding of diabetes" can be seen in this phase (C. Hernandez, personal communication, July 1999). Passive lifeways and metaphors are found in this phase, resulting in keeping a person from further integrating their diabetic and personal selves. Examples of the lifeways are denying, normalizing and diabetic selves, whereas the passive metaphors are; fitting in, going along with, carrying on, and being too busy for diabetes. The having diabetes phase may last for a few years or for the entire span of a person's life, before ever advancing to the next phase.

Turning Point

The turning point starts when there is some life altering event that occurs and "there is recognition that diabetes can no longer be diminished, denied or ignored and life with diabetes is reassessed and rethought" (C. Hernandez, personal communication, July 1999). This precipitating event can be physiological, such as a life-threatening episode, or psychosocial, such as experiencing a spiritual renewal, or a change in doctors. It is from this point that the person's focus changes and an interest in learning about diabetes and all that is involved with its regimen begins to develop. It is here that the diabetic self starts to take precedence over the personal self, and there is a renewed interest in trying to learn as much as possible about diabetes. They develop a more active role in the management of their diabetes, but continue to follow the regimen given to them by their primary care provider. Glycemic control continues to remain poor. The length of this
phase is not known. Once an individual reaches this point, they can either regress back to the having diabetes phase, or continue to go forward in their learning and growing process which would lead to the next phase, the science of one.

Science of One

The science of one is a personalized science of living with diabetes which is a gradual progression out of the second phase (Hernandaz, 1995). "It involves the ongoing incremental process of building a unique, personalized, and exact science of living with diabetes" (Hernandaz, 1996 p.46). It is here that the person focuses on living with diabetes by taking ownership of their disease and all the decisions that come along with it. There is a deep understanding of diabetes knowledge. A collaborative relationship develops with the primary care provider as the person develops their own way of living and managing their diabetes. They learn to “tune in” to their body cues, and to use the knowledge obtained through this process to manage their own disease (Hernandaz, 1995). This tuning in process is just one of several lifeways, the characteristic patterns of thought or action used without conscious knowledge, that facilitate integration of the diabetic and personal selves during this phase (Hernandaz, 1996). The diabetic and personal selves have integrated the most, and continue to do so throughout the remainder of the person’s life. In this phase, there is good glycemic control.

Adequacy of Framework

The theory of integration serves as an excellent framework for this study. It explains variations in individuals who are living with diabetes by allowing for continuous change in the disease process as the individuals go through the process of becoming a
diabetes expert with the merging of their identities. The theory accomplishes this by encouraging observation and exploration of personal experience, discovery of alternative practices and through education that promotes individual health (Hernandez, 1996). Education is key in this theory because it helps to improve upon a persons skills through self-care behavior changes by increasing his/her feeling of empowerment. It is also a critical component in helping individuals learn to become actively involved in integrating diabetes into their lives. This empowerment can help individuals deal with the psychological issues that can facilitate the diabetic and personal selves to merge, thereby influencing their control over their management of diabetes. This process of integration into the life and lifestyle of an individual, is accomplished through heightened self-awareness of the body, various lifeways, a deep understanding of one’s own diabetes, and taking ownership of one’s diabetes” (Hernandez, 1996 p.49).

Research Questions

1. What are the reported self-care behaviors of patients who have attended a diabetes program?

2. To what extent has diabetes become integrated into the lives of those who have attended a diabetes program?

The independent variable of this study is the diabetes education program. The dependent variables are integration of diabetes, and self-care behaviors.
Definitions of Variables

Integration

Integration is the basic social process that underlies the experience of living with diabetes, accounting for the changes and adjustments that occur over time following the diagnosis of diabetes (Hernandez, 1996). It is defined as “an ongoing process in which the two selves (diabetic and personal) more fully merge to create an individual who is healthy, both mentally and physically” (Hernandez, 1995 p. 19). Integration of diabetes will be measured by using the Diabetes Questionnaire (TDQ).

Self-Care Behavior

Needs related to illness, injury and defects that cause people to seek assistance and carry out prescribed measures necessary to treat, prevent or rehabilitate. Response for all events (self-monitoring of blood glucose levels, episodes of vigorous exercise and adequacy of taking medications) that indicate the differences of performing the behavior, whether improvement or decline. The Diabetes Self-Care Practice Instrument (DiSCPI) will be used to monitor the improvement of self-care behaviors.

Assumptions

1. The patients will answer questionnaires honestly
2. All patients are progressively moving towards integration.
3. Positive outcomes will occur with education.

Summary

This chapter discussed the theory of integration and showed how the theory guided this research project. A major component of this theory is the concept that there
is a process in which diabetes is brought into one's life, this process being integration. It allows for the understanding of the frustration that accompanies the diagnosis of diabetes, and the difficulty following and incorporating the demands that are placed on an individual in order to achieve glycemic control. Observation and exploration of personal experience, discovery of alternative practices and education all help in dealing with these demands by promoting individual health (Hernandez, 1996). Education is key in this theory because it helps to provide skills for self-care behavior changes which then empowers patients. This study utilized the theory of integration as a framework, which guided the individual's progression through the different stages of integration.
CHAPTER IV

METHODOLOGY

Introduction

The purpose of this research study was to evaluate the effect of an existing diabetes education program on the integration of diabetes and self-care behaviors of people with type 1 & type 2 diabetes. Assessing the effect of diabetes education on people with diabetes is important in providing health care providers with information regarding the efficacy of educational programs in assisting patients with diabetes management. This chapter describes the design of the study, the population being examined, and the setting of the study. Further information will also be given about the data collection procedures, ethical considerations, and measurements used to assess the variables of this outcome study.

Research Design

An outcomes research design was used for this study. Conducting an outcomes research study for a local diabetes education program facilitated the identification of the program’s impact on the integration of diabetes and self-care behaviors of patients with diabetes. There is a growing demand that providers justify interventions by evaluating treatment outcomes and systems of care, in terms of improved patient lives and costs of care (Burns & Groves p. 569- Hinshaw, 1992). As society increases the pressure on the
health care system to provide better care at a more cost-effective rate, the more outcome studies are needed.

Sample

The target population for this study was people with type 1 and type 2 diabetes from the age of 18 years and older. The accessible population was people with type 1 and type 2 diabetes from the age of 18 years and older, living in Las Vegas, and who were referred by their primary care provider to the diabetic education program being studied.

Subjects included all patients who attended the diabetes education program between the time periods of February 2000 and July 2000, and who met the following criteria; over the age of 18 years and English speaking. Each subject enrolled in the diabetes education program, voluntarily signed an informed consent that outlined the study protocol in full disclosure, and guaranteed anonymity and confidentiality within the study.

Diabetes Education Program

The Diabetes Education Program that was evaluated has been in existence since 1992. It is an outpatient program that offers twelve hours of diabetes education classes in group and individual settings. The first class starts with placing patients into a group assessment and introduction to behavior change class that is lead by a diabetes nurse educator. This class lasts for approximately two hours and presents the basics of
diabetes. During this class, the diabetes nurse educator obtains demographic data that is recorded on the demographic sheet.

The second class is considered the core class, which is four hours long. The first half of the class concentrates on an elaborated discussion of diabetes, with the second half focusing on meal planning with a diabetes nurse educator and a dietician. There are six additional hours offered that consist of continuing education with a multidisciplinary team comprised of registered nurses, a registered dietician, a physician and exercise physiologist. These last six hours of education offer information on medication; fat and carbohydrate label reading, exercise and weight management, stress management and goal writing. Once a total of twelve hours has been reached, follow-up sessions are done at three and twelve months for further assessment of the patient’s progress. This diabetes education program is in compliance with the American Diabetes Association Recognition Standards. In addition, it is in compliance with the preliminary HCFA outpatient diabetes education reimbursement registry, which became effective in October 1999 (DTCA Outpatient Product, 1999).

Primary care providers refer patients to the center for diabetes education. Costs for attending the diabetes education program and for the glycosylated hemoglobin levels are billed to each patient’s health insurance. Report of the completion of education activities and glycosylated hemoglobin results are sent to the primary care provider.

Measurements

Demographic data was collected from the patient’s chart at the diabetes education program. The Diabetes Questionnaire (TDQ) was used to measure the integration of
diabetes into one’s life and the Diabetes Self-Care Practice Instrument (DiSCPI) was used to measure self-care behavior.

Demographic Data

Demographic data of subjects was obtained from the demographic sheet already in use at the diabetes education program. Information obtained included age, education level, years of having diabetes, gender, type of diabetes, race/ethnicity, and type of medication being used.

The Diabetes Questionnaire

The Diabetes Questionnaire (TDQ) was used to measure the integration of diabetes into one’s life. It measured the self-reporting of the experience of living with diabetes, how knowledgeable participants were with their diagnosis and regimen, and how well they fit the regimen into their physical, psychological, and spiritual lives. This 14-item Likert instrument was self-reported and scored on an ordinal level of measurement with scores ranging from one to six, with 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree, and 6 = strongly agree. The possible range of scores was 15 – 90, with the higher scores reflecting that participants have integrated diabetes into their lives.

"The Pearson product moment correlation was .75, which is an indication that this is a reliable questionnaire in terms of stability" (Hernandez, 1995 p.25). Content and construct validity has been shown with the result of the initial pilot testing of this instrument (Hernandez, 1995). Internal consistency for the current study was measured using Cronbach’s coefficient alpha, which resulted in a .94 for the pretest and .95 for the posttest. Therefore, this questionnaire is suitable for research in adult clients with type 1
and type 2 diabetes, and may be a useful tool as an outcome measure, used pre/post-
education, in the evaluation of diabetes education programs (Hernandez, 1995).

**Diabetic Self-Care Practice Instrument**

Self-care behavior was measured through self-reporting of the frequency of self-
monitoring of blood glucose levels, episodes of vigorous exercise, and adequacy of
taking medication. Areas that were covered dealt with actions taken to attend to effects
of diabetes. Some examples of this would be, recognizing low blood sugar, taking
appropriate steps to elevate blood sugar, and monitoring blood glucose (Frey & Denyes,
1989). This questionnaire consisted of 17 items that were self-reported, with responses
scored on a percentage scale (ratio measurement) of 0% to 100%. The scale ranged from
0%, meaning they never do this, to 100%, meaning they always do this. The Pearson’s
product moment correlation obtained from one study ranged from .84 to .92 (Frey &
Denyes, 1989). Test-retest reliability of this instrument was reported to be .70 after three
weeks in a study conducted by Wang & Fenske (1996). Internal consistency for the
current study was measured using Cronbach’s coefficient alpha, which resulted in a .81
for the pretest and .80 for the posttest.

**Data Collection**

Verbal and written permission was obtained from the administrators of the
diabetes education program to conduct the study. A training session was provided for the
staff of diabetes nurse educators to familiarize them with the research project. In this
session, review of the questionnaires (Diabetes Self-Care Practice Instrument and the
Diabetes Questionnaire), consent form and how to enroll subjects were covered.
Questions were answered and the questionnaires were left in numbered envelopes for the diabetes nurse educators to distribute to the patients enrolled in the program at the beginning of the very first educational class. Each participant that voluntarily signed the informed consent was enrolled in this study and was asked to complete the two questionnaires provided for them. The sealed questionnaires were then collected by the diabetes nurse educators and placed in a file box in the office where they were to be collected.

The questionnaires were collected weekly, along with the demographic data. Two weeks after participants finished their six hours of education, a phone call was made to their homes to remind them to complete and return the two questionnaires that were mailed to their house. At this time, the participants were asked to answer the following three questions; (1) how many hours of education did you finish; (2) what factors contributed to you finishing or discontinuing the program; (3) what are some things that helped you or would have helped you to finish the program.

Ethical Considerations

The thesis committee members reviewed and approved this research project. Further approval was obtained by the following: The Department of Nursing UNLV Human Subjects Rights Committee, and the University of Nevada Las Vegas Human Subject Rights Committee (Appendix A) prior to the beginning of the study.

Participation in this research project did not impose any extra expense, travel time, or time missed from work for the participants. Each participant was following the educational regimen already in place at the diabetes education program, and this was not
changed or interrupted by participating in this research program. The expense for attending the diabetes education program was billed to each patient’s health insurance.

Data Analysis

Thirty-five questionnaires were distributed to potential research subjects in the introductory class at the diabetes education program. Three questionnaires were not returned after the initial education class, while two questionnaires were returned with one or more questions incomplete. Eight of the participants never returned the second set of questionnaires that were mailed to their house. Therefore, 22 were applicable for use with the integration of diabetes questionnaire, and 23 were used for the self-care behavior questionnaire.

Demographic Data

Demographic characteristics were obtained from the demographic sheet already in use at the diabetes education program. Areas of interest for this study included age, education level, years of having diabetes, gender, type of diabetes, race/ethnicity, and type of medication being used. For each area, frequencies and percentages were analyzed to provide an overview of the sample.

Research Question #1

The Diabetes Self-Care Practice Instrument (DiSCPI) was used to answer the question, “What are the reported self-care behaviors of patients who have attended a diabetes program”. Frequency analysis and paired sample t-tests were used to determine the difference of self-reported self-care behaviors of patients prior to and after receiving 6
hours of diabetes education. All seventeen questions were answered on a percentage scale (ratio measurement) with 0% meaning never and 100% meaning always.

Results of this questionnaire were obtained by looking at each individual question rather than obtaining a summation. It was felt that by using a summation of scores on this questionnaire, valuable information would be missed. Looking at individual questions allowed examination of specific areas of self-care behaviors that significantly increased to be identified. Therefore, the sample size was different for each question depending on how many participants answered the question completely on the pre and posttest questionnaire.

Research Question #2

To answer the question, “To what extent has diabetes become integrated into the lives of those who have attended a diabetes program?” participants were given The Diabetes Questionnaire (TDQ) to complete. This 14-item Likert instrument was answered on a interval level of measurement with scores ranging from one to six, with 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree, and 6 = strongly agree. The range of the total scores was from 15-90, with the higher scores reflecting that diabetes has been integrated into their lives.

One-tailed paired sample t tests were conducted on individual questions for the pretest and posttest questionnaires for both integration and self-care behavior. Also, the total sum of scores for the pretest and posttest questionnaire for integration was evaluated utilizing the same test. One-tailed tests were conducted because it is assumed that positive outcomes will be obtained with education. The Bonferroni correction was
utilized for calculating the alpha level of .005, which was used to determine significance and to decrease the risk of a Type 1 error.

Methodological Limitations

A limitation of the study is the lack of participants obtained. The number of participants obtained in each weekly class was far less than predicted by the diabetes education center. This could be due to either a low census or miscalculation of previous class sizes by the diabetes education center. A sample size of eighty subjects was needed to attain a moderate effect size with an alpha level of .05 and a .80 power level. A sample size of 32 was obtained with only 22 questionnaires used for the analysis.

The study was conducted with a convenience sample, which puts it at risk for not having a true representation of the target population of individuals with diabetes. Demographic data was collected to compare the accessible population with the target population.

The use of glycosylated hemoglobin levels had to be omitted from the study due to policy changes at the diabetes education center. Glycosylated hemoglobin levels were no longer a part of the required program, and therefore it wasn’t possible to obtain these results.

Summary

This outcome study was designed to evaluate what influence diabetic education has on the variables of self-care behaviors and level of integration of diabetes in patients with type 1 & type 2 diabetes. A convenience sample of 32 participates was obtained.
with 22 questionnaires being able to be utilized for the study. Frequency distributions, descriptive statistics and a comparison of group means were used for data analysis.
CHAPTER V

RESULTS

Introduction

This chapter presents the results of the study relating to self-care behaviors and level of integration of diabetes in a person’s life after attending diabetes education classes. This will include descriptive statistics of the sample, self-care behaviors, the level of integration of diabetes and a summary of the results.

Sample Description

Questionnaires were distributed to thirty-four subjects in the introductory class at the diabetes education program. Of these thirty-four questionnaires that were delivered, two were not returned, and thirteen questionnaires were returned incomplete (having one or more questions left unanswered). Nineteen questionnaires were returned 100% complete.

Demographics

Demographic information was obtained from the demographic sheet already in use at the diabetes education program. Descriptive statistics were used to analyze the data, which can be seen in tables 2-4.

Table 2 describes gender and ethnicity of the sample. This sample was predominantly male (n=20, 90.9%), with only two females enrolled in the study (9.1%).
The age span ranged from 37-81 years of age, with the mean age of 61 years. The majority of participants (n=19, 86.5%) were Caucasian, with one person being Hispanic, one being African American, and one person did not complete this question. Of the 22 subjects that participated, 18 indicated their level of education. The range for completed years of education was 12-18, with the mean being 13 years of education.

Table 3 describes the participant’s type of diabetes, the duration of having diabetes and the medications that they are currently taking. The range of years of having diabetes was from 0 (newly diagnosed) to 17 years. All participants reported having type 2 diabetes with a mean duration of 3 years. Five (22.7%) participants reported taking no medication, while 14 (63.6%) were taking some type of oral hypoglycemic agent, and 3 (13.6%) were using an oral/insulin combination.

As depicted in Table 4, 73.7% (n=14) reported checking their glucose levels at home, while 26.3% (n=8) stated that they never check their own glucose levels. Also, 45.5% (n=10) stated that they check their own feet daily, with 4.5% (n=1) report checking them weekly, 4.5% (n=1) report checking them monthly and 45.5% (n=10) stated that they never check their own feet. Cardiovascular/weight training programs were done on a weekly basis by 13.6% (n=3) of the sample, 27.3% (n=6) stated they walk on a weekly basis, and over half of the subjects (59.1%, n=13) reported never doing any type of exercise.
Results of Research Questions

Research Question #1

The DiSCPI was used to answer the question “What are the reported self-care behaviors of patients who have attended a diabetes program?”. Study participants were asked to complete this 17 item self-report instrument with a response scale ranging from 0% to 100%. Those that reported 0% meant that they never participate in that activity, while those that answered 100% meant that they always do that activity. This instrument was used to measure both general self-care actions and specific actions taken to control diabetes.

The means for each pretest and posttest questions can be seen in table 5. The overall summation of the questionnaire was not done. It appeared that answering this question by evaluating the individual questions of self-care behavior would be more meaningful than would a summary of scores. Specific areas of self-care behavior that significantly increase would be able to be identified and valuable information would not be missed.

The questions on the DiSCPI can be grouped according to content. The first grouping noted is concerned with diet. Two questions appeared to have a significant increase from the pretest to the posttest. The first question asks, “what percent of the time do you eat the foods according to your meal plan?”. A one-tailed paired sample t test was calculated to compare the mean pretest score to the mean posttest score. The mean on the pretest was 51.7 (sd = 32.5) and the mean on the posttest was 71.5 (sd = 16.6). A significant increase was found (t(22) = 2.802, p=.005). The second question in the diet category is “what percent of the time do you eat snacks at the right time during
the day?". A one-tailed paired sample t test was calculated. The mean on the pretest was 26.8 (sd = 35.1) and the mean on the posttest was 48 (sd = 31.8). A significant increase was found (t(21) = 3.049, p=.003).

A one-tailed paired sample t test was performed on the question "what percent of the time do you eat the number of snacks on your meal plan?". The pretest mean was 26.3 (sd = 31.2) and the posttest was 46.5 (sd = 29.5). No significance difference was noted (t(22) = 2.790, p>.006), but with a larger sample, significance may have been found.

The second self-care behavior category identified was blood glucose monitoring. The question identified asks "what percent of the time do you record the results of your blood glucose test in a logbook?". A one-tailed paired sample t test was calculated. The mean on the pretest was 48.2 (sd = 47.4) and the mean on the posttest was 76.5 (sd = 37.6). A significant increase was found (t (22) = 3.239, p=.002).

The third category deals with health promoting activities. This question asks "what percent of the time do you get the additional exercise necessary for diabetes?". A one-tailed paired sample t test was calculated. The mean on the pretest was 26.5 (sd = 29.3) and the mean on the posttest was 42 (sd = 27.6). A significant increase was found (t(22) = 3.023, p=.003).

The final category identified incorporates treating diabetes reactions. Two questions were analyzed. The first question asks "what percent of the time do you carry a sugar source to treat reactions?". A one-tailed paired sample t test was calculated. The mean on the pretest was 20 (sd = 36) and the mean on the posttest was 49.5 (sd = 47). A significant increase was found (t(22) = 3.045, p=.003). The second question asks "what
percent of the time are you able to do the kind of things to bring your blood sugar up?”.
A one-tailed paired sample t test was calculated. The mean on the pretest was 45.8 (sd = 40.9) and the mean on the posttest was 64.3 (sd = 40.6). A significant increase was found (t(22) = 3.323, p=.002).

In summary, to answer the question “What are the reported self-care behaviors of patients who have attended a diabetes program?” four categories of significant findings arose. Behavior change occurred with increasing awareness of one's diet by eating the appropriate foods (51.7% to 71.5%) and eating snacks at the right time of the day (26.8% to 48%). Also increasing health-promoting activities with the participation in exercise (26.5% to 42%), recording results of glucose tests (48.2% to 76.5%), treating diabetic reactions with carrying sugar (20% to 49.5%) and increasing the ability to treat hypoglycemic reactions (30.6% to 64%) occurred. An area found to have no significant increase was, eating the number of snacks according to a meal plan (26.3% to 46.5%). Even though this did not produce a statistical significant increase, clinically, the mean increase from pretest to posttest would probably be significant.

Research Question #2

The TDQ was used to answer the question “To what extent has diabetes become integrated into the lives of those who have attended a diabetes program?”. Study participants were asked to answer this 14-item questionnaire that is based on a six-point Likert scale: strongly disagree (1), moderately disagree (2), slightly disagree (3), slightly agree (4), moderately agree (5) and strongly agree (6). Scores range from 14-84 with the higher score denoting higher levels of integration.
The means for each individual question can be seen in table 6, along with the overall summation of the pretest and posttest in table 7. This questionnaire was evaluated by looking at individual questions for specific areas of integration that changed, and by looking at the tool as a whole for the overall change of integration. The mean for the overall summation of the pretest was 55% (sd = 17.8) and the mean for the posttest was 65% (sd = 15). A one-tailed paired samples t test was performed and a significant increase was found (t(21) = 2.998, p=.004).

Three individual questions were evaluated to determine if there was a difference between the pretest and posttest responses. The first states that “living with diabetes has taught me a lot about how diabetes affects my body”. The mean of the pretest was 4 (sd = 1.7) and the mean of the posttest was 5.2 (sd = 1.2). A one-tailed paired samples t test was preformed and a significant increase was found (t(21) = 2.890, p=.005). The second question that was evaluated states “I am aware of cues from my body that tell me about my blood sugar level”. The mean of the pretest was 3.8 (sd = 1.6) and the posttest was 4.8 (sd = 1.2). A one-tailed paired sample t test was performed and a significant increase was found (t(21) = 2.822, p=.005). The third question states “I know more about taking care of my diabetes than anyone”. The mean pretest was 2.5 (sd = 1.8) and the mean posttest was 3.9 (sd = 1.7). A one-tailed paired sample t test was preformed and a significant increase was found (t(21) = 3.044, p=.003).

In conclusion, to answer the question, “To what extent has diabetes become integrated into the lives of those who have attended a diabetes program?” three individual questions were significant, along with the summation of the questionnaire.
The individual questions that showed the greatest change from pretest to posttest dealt
with knowing how diabetes affects my body, awareness of bodily cues, and knowing
more about taking care of my diabetes than anyone.

Additional Findings

Participants were asked to answer three questions once they finished at least six
hours of education. These questions were, 1) how many hours of education did you
finish; 2) what factors contributed to you finishing or discontinuing the program; and 3)
what are some things that helped you or would have helped you to finish the program.
To answer the first question, frequency analysis was done and 81.8% (n=18) reported
having finished 6 hours of education, 4.5% (n=1) reported having finished 9 hours, and
13.6% (n=3) reported to having finished 10 hours of education.

The other two questions were answered by analyzing the content of the responses
of the participants. The responses were grouped according to subjects or themes that
seemed to be present. Answers to the question “what factors contributed to you finishing
or discontinuing the program?” were very limited. Every participant had finished the
required six hours of education needed for this study. Some had decided to continue on
with the program untill they completed the twelve hours that were available to them
through the education program. No participant reported having finished the twelve hours
of education. As for why they discontinued the program, no one answered that they had
quit.

In answering the question, “What are some things that helped you or would have
helped you to finish the program?” some reoccurring themes arose, with some subjects
agreeing with the statement, “I would like to see smaller classes, and shorter classes”.

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Other participants supported the statement, “I would like to see weekend or night classes” and “the hours don’t fit with my work schedule”. Two other participants answered this question stating “I wanted to continue to learn about diabetes”, and, “they let my husband come to the classes, so he too could learn along with me”. Another participant who had been diagnosed with diabetes for a few years stated, “I wanted a refresher course, the last time I attended one of these classes was when I was first diagnosed with diabetes, a lot has changed since then”. Some participants stated that learning about diet was the main reason for going back or kept them wanting to go back, while two other participants said that it was because the doctor told them to go. Statements about diet include “I wanted to help myself, and to do so I needed diet information”, “I have neglected to watch my diet and indulged in poor eating habits, I wish I had paid more attention to diet and lifestyle, I need to learn about this the most”, and “having diabetes has helped me to eat healthier, I’ve learned a great deal”.

Summary of Results

This chapter has presented the summarized findings of this study. It identified that the majority of subjects were Caucasian males around the age of 61 years having the diagnosis of type 2 diabetes for less than one year. The majority of participants had at least 12 years of education with the mean being 13 years, and that they mostly had their diabetes controlled by an oral hypoglycemic agent (n=14). Reported activities that subjects participated in included checking their glucose levels at home (73%). Other activities with less reported involvement include engaging in exercise to help diabetes (59% never exercising) and evaluating their feet on a daily basis (50% checking them once monthly or less).
Self-Care Behaviors

The most significant changes that occurred after participants finished six hours of diabetes education were diet, logging glucose, exercise, and treating hypoglycemia. Changes in eating the foods according to a diabetes meal plan ($t(22) = 2.802, p < .005$), and eating snacks at the right time of the day ($t(21) = 3.049, p < .005$) increased significantly after six hours of education. Most participants stated that they already monitored their blood glucose level, but a significant change was noted in the logging of their blood glucose levels in a logbook ($t(22) = 3.239, p < .005$). Additional exercise needed for diabetes increased ($t(22) = 3.023, p < .005$) along with the participant’s knowledge of how to treat a hypoglycemic reaction ($t(22) = 3.323, p < .005$) and the percent of time those individuals carried a sugar source to treat hypoglycemic episodes ($t(22) = 3.045, p < .005$). An area found to have no significant increase was, eating the number of snacks according to a meal plan (26.3% to 46.5%).

Integration of Diabetes

Integration of diabetes was found to significantly increase after six hours of diabetes education was completed ($t(21) = 2.998, p < .005$). Individual components of the tool were also analyzed. Knowing how diabetes affected one’s body through living with diabetes was found to significantly increase ($t(21) = 2.890, p < .005$), along with the participants awareness of bodily cues telling them about their blood sugar ($t(21) = 2.822, p < .005$), and about their knowledge of diabetes ($t(21) = 3.044, p < .005$).
CHAPTER VI

DISCUSSION

Introduction

This chapter presents a discussion of findings with identified conclusions and additional findings. Implications for nursing, limitations of the study and recommendations for further research are also presented.

Discussion of Findings

Description of the Sample

Questionnaires were distributed to thirty-four individuals with diabetes, and nineteen were returned completed. It was decided to accept individuals with both type 1 and type 2 diabetes into the study, but the sample consisted of individuals with type 2 diabetes only. The most common type of diabetes is type 2 and it affects 90%-95% of people after the age of 40 (CDC, 1999), so it wouldn’t be uncommon to obtain only people with type 2 diabetes in such a small sample. Other reasons for the small sample and for only receiving individuals with type 2 diabetes could be that the actual number of individuals that attended the diabetes education program may have been lower than what was originally reported. Another reason could be due to changes made at the diabetes education center just prior to the start of the study.
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actions and specific actions taken to control diabetes. Each individual question was analyzed for significance.

Frey & Denyes in their 1989 study found that basic conditioning factors (age, sex, developmental stage, conditions of living, family system factors, sociocultural orientation, patterns of living, health state and health care system factors) had no significant correlation with self-care behaviors (health-deviation self-care). They did conclude that there was “a moderate negative relationship (r = -.46, P = .009)” between self-care behaviors and metabolic control, reflecting that those who performed higher levels of self-care behavior (health-deviated self-care) had better metabolic control (Frey & Denyes, 1989 p.73). These variables weren’t addressed in this study. Instead of analyzing basic conditioning factors, this study looked to see if there was a significant increase in self-care behavior after attending education classes. Significance was found in four categories of self care behavior which include, diet, health promotion, recording levels of blood glucose and treating adverse reactions. Frey & Denyes’s study gives support to findings in this study in that the increase seen in some of the self-care behaviors may not be due to the basic conditioning factors identified, which would give strength to the idea that education was probably the primary reason for the increase in these behaviors. Wang & Fenske’s 1996 study further provides strength to the finding of this study. They concluded that an increase in self-care behavior (health-deviated self-care) was significant (t = 2.4614, P = .0212) for subjects who received support from a diabetes support group versus those without a support group.

Swift et al’s 1995 study, gives support to this study’s finding of significance in getting additional exercise necessary for diabetes. They reported that 52% of their total
subjects (n=83) adhered to some type of exercise (40.9% noted in this study) and that the reason most often identified for exercising was to control diabetes (51%). In this study, the mean pre-test answer for getting additional exercise necessary for diabetes was 26.5% which then increased to 42%. Even though individuals on average were only getting 42% of the exercise needed for diabetes, the fact that there was an increase in this behavior after receiving diabetes education is important. Chan & Molassiotis's (1999) study found that compliance rates were highest with medication regimens, and home monitoring of blood glucose levels, while the lowest amount of compliance involved lifestyle changes, such as exercise. Therefore, if the trend is low participation in exercise, than improvement in this area, even though small, is a step in the right direction for changing self-care behaviors, which in turn will help maintain glycemic control (Peyrot & Rubin, 1994).

As stated earlier, Chan and Molassiotis (1999) confirmed that the highest rate of compliance in their study was found to be with medication regimens, followed by home monitoring of blood sugar levels. This supports findings of the present study with 73.7% (n=14) of the sample reporting checking their blood glucose levels prior to attending classes at the diabetes education center. Chan and Molassiotis also concluded that only 39% of the subjects kept sugar with them to treat hypoglycemic reactions despite 50% of the subjects reporting to having hypoglycemic reactions (1999). This follows similar findings from the present study. It was indicated on the pre-test that 45.8% of the time subjects were able to do the kind of things to bring blood sugar up, while on the post-test the responses increased to 64%, which was significant at .005. Also it was recorded that only 20% of the time was a sugar source carried to treat hypoglycemia in the pre-test,
which increased to 49.5% on the post-test. Again, even though the behaviors were not carried out the majority of the time, results indicated that there was a significant increase in the behavior which helps point towards an increase in self-care behavior actions and awareness.

Schmidt, Rost, McGill and Santiago reported a positive correlation between improved blood glucose control and eating the same pattern of meals and snacks every day in their 1994 study. This lends support to the present study with findings of significant increase of patients reporting to eating the foods according to their meal plan, and to eating snacks at the right time during the day. Even though no significance was noted in the present study concerning eating the appropriate number of snacks on one’s meal plan, it is felt that with a larger sample, this too would support the findings of Schmidt et al’s. study.

In conclusion, the answer to the question, “What are the reported self-care behaviors of patients who have attended a diabetes program?” was an increase in the area of diet (eating the right foods and snacks), exercise (getting the additional exercise needed for diabetes), glucose monitoring (recording glucose results in a log) and treating hypoglycemic reactions (knowing what to do, and carrying sugar with them).

Research Question #2

The TDQ was used to answer the question “To what extent has diabetes become integrated into the lives of those who have attended a diabetes program?” Findings in this study showed a significant increase in the integration of diabetes. The sum of scores for the pre-test and post-test were compared using a one-tailed paired sample t test which was significant at .005. This increase in integration can be looked at as the first step for
individuals to merge their personal and diabetic selves into one. With the majority of subjects being newly diagnosed (n=13), it would be almost expected that integration would increase after education because there was limited knowledge of the disease prior to starting the classes. For this reason alone, one would expect to see an increase. The next phase that will be facing these newly diagnosed subjects, will be to continue on their learning path, moving through the turning point phase, and eventually entering into the science of one phase where they become the diabetes expert. As for the other nine subjects whom have had diabetes for one year or longer, one can only speculate that they too were either in the beginning phase or the turning point phase. It could be that the integration of diabetes occurs over a greater period of time than what was tested in the present study.

After analyzing the individual questions, it was found that there was significance in three areas. The mean for the statement, “Living with diabetes has taught me how diabetes affects my body” was a 4 on the pretest (meaning they slightly agreed with it) and a 5.2 on the posttest (meaning they moderately agreed with it). A possible reason for the significant increase would be due to the increased knowledge that was obtained by attending the educational classes. The statement, “I’m aware of my bodily cues telling me about my blood sugar” was also significant with the pretest being 3.8 (between slightly disagree and slightly agree) and the posttest at 4.8 (between slightly agree and moderately agree). The increase seen in this statement might be due to individuals not fully understanding how diabetes could make them feel. After learning about diabetes, they may now understand that what they were feeling was due in part to diabetes and not some other outside factor. The last area of significance was with the statement “I know
more about taking care of my diabetes than anyone” with the pretest at 2.5 (between moderately disagree and slightly disagree) and the posttest at 3.9 (slightly disagree but leaning more towards slightly agree). The answer to this would be expected to be low. Following the Theory of Integration, those that would state that they strongly agree with this statement, would be the ones considered in the science of one phase, otherwise known as the diabetes experts. Seeing how the majority of the subjects were newly diagnosed with diabetes, it would be expected to have the majority disagreeing with the statement, but becoming more confident after attending educational classes.

Additional Findings

In answering the question “What are some things that helped you or would have helped you to finish the program?” some subjects answered with “I would like to see smaller classes, and shorter classes”, while a few others said “I would like to see weekend or night classes, the hours don’t fit with my work schedule”. The response that the hours interfere with work were also found in Schrock’s 1998 study. It was found that “because many of the patients diagnosed with type 2 diabetes were still in the workforce, conducting classes in the evening and/or weekend would be helpful” (Schrock, 1998 p.491). This present study had nine individuals that were 60 years or younger with 13 reporting to be between the ages of 61 and 81. Another reason for having such a small sample size and small volume of participants in the education program could be that individuals today are continuing to work longer into their lives with second careers, postponing retirement. It might be beneficial to investigate this matter to better serve the diabetes community.
Another area of interest was the reported number of individuals that check their feet on a regular basis. This study found that 54.5% of subjects reported to checking their feet on a weekly/daily/monthly basis (n=12), while 45.5% (n=10) stated that they never check their feet. Checking of one’s feet was only evaluated at the initial class before any education was offered. It would be beneficial in the future to evaluate this area after individuals receive education to identify if a significant increase in the activity does occur. Chan and Molassiotis reported that “patients paid little attention to foot care as only 60.8% of them complied with this activity which was indirectly related to day-by-day control” (1999, p.436). This behavior of not checking feet could be considered dangerous because having diabetes makes the healing process much more difficult. If a person were to let a sore on the bottom of their foot go without medical attention, a serious, if not life-threatening, infection could occur. An infection such as this could be prevented with a watchful eye and prompt medical intervention.

Conclusions

The purpose of this study was to evaluate the effect of a diabetes education program on the integration of diabetes and on self-care behaviors. Several conclusions have been drawn from this current study.

1. Changes in ones eating patterns occurred after receiving education about diabetes and meal planning. These patterns included eating according to a diabetes meal plan and eating snacks at the right time of day.

2. The majority of individuals were already monitoring their glucose levels at home, but increased in their activity of recording their results in a logbook.
3. The ability to bring one’s blood sugar up increased after being educated on it, along with the action of carrying a source of sugar to treat those reactions.

4. The amount of reported exercise individuals participated in increased.

5. Overall, Integration of Diabetes increased after receiving diabetes education.

6. Awareness of bodily cues that signifies how diabetes affects a person’s body increased.

7. There was a significant increase in participant’s perceptions of how diabetes affects their bodies through living with diabetes.

8. Participants did not feel like they knew more about diabetes than other health providers, but this area increased significantly.

Limitations

The sample was one of convenience with every subject that entered into the diabetes education program having the opportunity to participate. Additionally, because the sample size was small, mostly made up of Caucasian males with type 2 diabetes, the study results are only generalizable to subjects who fit this description and who attend the diabetes education program that was evaluated.

Glycosylated hemoglobin levels originally were to be tested prior to education and three months after. Due to a decrease in the diabetes education programs attendance record, and policy changes within the facility, this variable had to be omitted from the study.
Implications for Nursing

The results of this study suggest that diabetes education does impact self-care behaviors and integration of diabetes. This lends support to the research being done today. Diabetes research is currently turning its focus to answer the question, what are the educational outcomes relating to diabetes management. Efforts are being made to support the idea that diabetes education does have a positive outcome on decreasing secondary complications, managing and controlling glycemic control, increasing awareness of community resources and increasing overall knowledge and self-care behaviors to reflect a healthy individual. To further the research being done on the outcomes of diabetes, emphasis is needed on issues of replicability, representativeness of participants and maintenance of outcomes (AADA, 1999).

Only a small percentage of participants in this current study reported taking part in the proper amount of exercise needed for diabetes. It is known today that exercise not only lowers blood glucose levels, but also the decreases risk of cardiovascular disease, decreases body fat, and decreases blood pressure (Swift et al. 1995). With this in mind, diabetes education centers need to examine how to increase subject's participation of exercise and increase their focus towards attaining and increasing exercise participation. Along these same lines, focus for developing standards of care for the diabetic foot needs to be continued because fifty percent of amputations could be prevented (Chan & Molassiotis, 1999).

As the push for justifying the importance of education is underway, so is the push for increasing diabetes health care provider's awareness of the idea of integration of
diabetes and not just the adherence to it. Diabetes educators need to become more aware of their client and be able to flow and adapt to each client’s special need. Hernandez (1995) has shown support for the idea that compliance/adherence relationships are not effective for promoting good outcomes, and that a potential better way would be through the idea of integrating diabetes into one’s life. To do this, diabetes educators would have to learn to let the client lead in beginning and maintaining relationships, as well as being more empathetic and becoming more reflective in their interactions with each client (Hernandez, 1995).

In conclusion, identification of educational outcomes and how they relate to glycemic control needs to continue. To do this, replication of studies need to be done, providing validity and reliability to the findings. Educators need to continue to present the importance of exercise, diet and glucose monitoring in their respected interactions of clients with diabetes. Until evidence is provided that educational outcomes are beneficial for the maintenance of diabetes, there will be continued speculation about whether what is being done for diabetes is really working, and whether financial support provided for education is justifiable.

Recommendations for Further Research

Results from this study give support to the idea that education positively affects self-care behaviors and integration of diabetes. Additional research is needed in the area of concluding what are the educational outcomes for diabetes. Information on how educational programs assist in the management of diabetes is vital if support and funding for current programs, and diabetes educators are to continue. To do this, focus must be
placed on identifying what format/curriculum’s are best suited for delivering effective diabetes education. This should include identifying what treatment is effective for what population, type1 vs. type 2, whom is the information best delivered by, under what set of conditions, and what outcomes are expected to be seen (AADE, 1999). Also, efforts should be focused on what maintains or sustains improvements after diabetes education has been completed.

Finally, research should focus on the utilization of the theory of integration rather than adherence or compliance. It is time for diabetes educators to reassess their role in diabetes education programs by steering away from the use of compliance/adherence concepts, and looking more towards the use of integration. Integration emphasis’s how self-care behavior change can result from an increase in knowledge and willingness of a person to adapt. This has been cited as a possible new way to deal with diabetes due to numerous failed attempts at supporting the idea that adherence is essential for achieving glycemic control (Hernandez, 1995).
REFERENCES


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Diabetes Treatment Centers of America, Inc. (May, 1999). *Diabetes Treatment Centers of America Outpatient Product, 1*, 1-2


APPENDIX I

UNLV HUMAN SUBJECT RIGHTS COMMITTEE APPROVAL
DATE: February 7, 2000

TO: Tara McGill
    Nursing
    M/S 3018

FROM: Dr. Jack Young
      Chair, Biomedical Sciences Committee
      UNLV Institutional Review Board

RE: Status of Human Subject Protocol Entitled:
   "An Outcomes Study of Diabetes Education"

OSP #501s0100-207

This memorandum is official notification that the protocol for the project referenced above has
been approved by the Biomedical Sciences Committee of the Institutional Review Board. This
protocol is approved for a period of one year from the date of this notification and work on the
project may proceed.

Should the use of human subjects described in this protocol continue beyond a year from the date
of this notification, it will be necessary to request an extension.

If you have any questions or require any assistance, please contact the Office of Sponsored
Programs at 895-1357.

cc: OSP File

Office of Sponsored Programs
4505 Maryland Parkway • Box 451037 • Las Vegas, Nevada 89154-1037
(702) 895-1357 • FAX (702) 895-4242

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APPENDIX II

APPROVAL TO USE THE DiSCPI

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February 25, 1999

Maureen A. Frey, Ph.D., RN, MSN
Nursing Research

Tara Degan
UNLV
4920 Wind Break Lane
North Las Vegas, Nevada 89031

Thank you very much for your interest in my research. Enclosed you will find a copy of The Diabetes Self-Care Practice Instrument. I hope you find this helpful. Complete and return the enclosed request form. This letter will serve as permission to use the scale.

Sincerely,

Maureen Frey

Children's Hospital of Michigan
3901 Beaubien Detroit, Michigan 48201-2196
APPENDIX III

APPROVAL TO USE THE TDQ
September 28, 2000

Dear Tara:

This letter is being written as follow-up to our earlier correspondence by email. I have given you permission to use my instrument, The Diabetes Questionnaire (TDQ), to measure diabetes integration in your thesis research, by email, and hereby confirm this permission via this letter.

It has been a pleasure corresponding with you over these past months. I am pleased to learn of the near completion of your thesis and wish you all the best in your future nursing endeavours.

Sincerely,

Cheri Ann Hernandez, RN, PhD, CDE
Associate Professor
APPENDIX IV

LETTER OF APPROVAL FROM THE DIABETES EDUCATION PROGRAM
October 19, 2000

University of Nevada Las Vegas
4505 Maryland Parkway
PO Box 451029
Las Vegas, Nevada 89154-1029
Attn.: Department of Nursing

To whom it may concern:

Desert Springs Diabetes Treatment Center authorizes Tara McGill to conduct her research project, *The Effectiveness of Diabetes Education: An Outcomes Study*, at this facility from January 2000 to June 2000. It is felt that her project is within all human subjects' right guidelines and we are pleased to collaborate with her in this endeavor.

It is understood that her research project will be conducted at the Diabetes Treatment Center's Education Classes. Tara's participation in this study will include: Access to all patients' demographic sheets and their glycosylated hemoglobin level results who are participants in the education program and have consented to be part of the study. Educating the nurses at Diabetes Treatment Center concerning the study and their participation. This will include review of the questionnaires and consent form for the study. Telephoning patients for their three-month follow up visit. Sharing the results of the research with the Diabetes Treatment Center.

Our research participation will include: Nurses at the Diabetes Education Center attending the educational session concerning the study. Distributing, collecting and obtaining informed consent at the introductory class.

We understand that the names of all participants and the diabetes treatment center itself shall remain anonymous in reporting research results. We are eager for Tara McGill to conduct the research at our facility and look forward to participating in this study. If there are questions regarding this matter, please contact me at 369-7560.

Sincerely,

Joyce Malaskovitz R.N., Ph.D., C.D.E.
Program Senior Director

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APPENDIX V

CONSENT FORM
An Outcomes Study of Diabetes Education

Informed Consent to Act as a Research Subject

Tara McGill, a graduate student at UNLV, is conducting a research project to further understand the outcomes of attending a diabetes education course for people with diabetes mellitus. I understand that I am volunteering to be a participant in this research project. I understand that I will be asked to answer two questionnaires concerning my management of diabetes mellitus. I am also being asked to allow Tara McGill to review my demographic data sheet for pertinent information from the Diabetes Education Program.

The questionnaires will take approximately 15 minutes to complete, which will be done during the introduction class at the diabetes education center and again two weeks after completing six hours of diabetes education classes. The researcher, Tara McGill, will telephone to remind me that the questionnaires will be mailed to my home after completing six hours of class. Participation in this research project should not involve any added risks or discomforts to me. I understand that I have the right to withdraw from the study at any time, and in doing so, this will not interfere with my continued education and care received at the Diabetes Education Center.

I understand that by participating in this research project, I will be contributing to identification of how education affects the management of diabetes. Participation in this research project will not impose any extra expense.

I understand my research record will be kept completely confidential and that my identity will not be disclosed in any publication of the results of this research project. This research project has been explained to me and my questions have been answered by the diabetes nurse educator. If I have any other questions, I can contact Tara McGill at 1-702-895-3360 at UNLV. If I have questions concerning my rights as a research subject, I may contact the Office of Sponsored Programs at 1-702-895-1357. I have read and discussed the above information. On that basis, I give consent for my voluntary participation in this research project.

Signature of Subject ____________________________ Date ____________

Location ____________________________
APPENDIX VI

INSTRUMENTS
DIABETES SELF-CARE PRACTICE INSTRUMENT (DiSCPI)

INSTRUCTIONS

A. Please answer the questions by writing in the number that best answers the question for you.

B. There are no right or wrong answers. Some questions may seem alike. Please answer all the questions.

C. You may write comments or explain your answers next to the questions.

For each question write in the percent (%) from 0 to 100 that best answers the question for you. 0% would mean "none of the time" or "never", 50% would mean "half of the time", and 100% would mean "all of the time" or "always". Numbers in between would mean amounts between never and always. You might want to think about it as a line with 0% at one end, with 100% at the other end, and with the other numbers in between like this:

<table>
<thead>
<tr>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Always</td>
</tr>
</tbody>
</table>

___% 1. What percent of the time do you eat the foods according to your meal plan?

___% 2. What percent of the time do you eat the number of meals on your meal plan?

___% 3. What percent of the time do you eat meals at the right times during the day?

___% 4. What percent of the time do you eat the number of snacks on your meal plan?

___% 5. What percent of the time do you eat snacks at the right times during the day?
6. What percent of the time do you wear Medic-Alert identification?

7. What percent of the time do you carry a sugar source to treat reactions?

**IF YOU DO NOT USE INSULIN, PLEASE SKIP TO QUESTION #11**

8. What percent of the time do you give your own insulin?

9. What percent of the time are you careful in drawing up your insulin?

10. What percent of the time do you give your insulin at about the same time every day?

11. What percent of the time do you get the additional exercise necessary for diabetes?

12. What percent of the time do you do your own blood glucose testing?

13. What percent of the time do you do the recommended number of blood glucose tests?

14. What percent of the time do you record the results of your blood glucose test in a logbook?

15. What percent of the time are you able to do the kind of things that are necessary to bring your blood sugar up?

16. What percent of the time are you able to do the kind of things that are necessary to bring your blood sugar down?

17. What percent of your diabetic care are you personally responsible for now?
18. How much of a problem is having diabetes for you now?  
(Circle your answer)

Not a Problem	Sometimes a Problem	Usually a Problem	Always a Problem

19. How happy are you with the amount of responsibility you have for your diabetes care now?  

Very unhappy	Unhappy	Happy	Very Happy

20. I think the amount of responsibility I have for my care now is:  
(Circle your answer)

Too Little	About Right	Too Much

21. What feelings would you like to share about what having diabetes means to you? Write on the back if you need to.
The Diabetes Questionnaire

What is living with diabetes like? Read each statement carefully. Then, circle the number that shows the extent to which you Agree or Disagree with the statement. Note: Circling number 1 means you disagree the most, number 2 the next most and number 3 is least disagreement. Circling number 6 means you agree the most, number 5 is less agreement and number 4 is least agreement.

e.g. Let's say the statement was “I get tired more often than before diabetes.” If you do not get tired more often, then you disagree with the statement. So you would circle one of the numbers on the disagree (or left) side—either number 1, 2, or 3. For example, if you feel you strongly disagree with the statement, you would circle number 1.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Moderately Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Moderately Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Living with diabetes has taught me a lot about how diabetes affects my body</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. I am aware of cues from my body that Tell me about my blood sugar level</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3. I don’t mind telling people I have diabetes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4. I work to try and keep my blood Sugar in a certain range</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5. I feel confident of what I have to do if my blood sugar is too high or too low</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6. Living with diabetes teaches me to pay Attention to my body</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7. I can adjust my diabetes routine to fit most new situations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Moderately Disagree</td>
<td>Slightly Disagree</td>
<td>Slightly Agree</td>
<td>Moderately Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>---</td>
<td>------------------</td>
<td>---------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>8. Living with diabetes has become natural for me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9. I take action based on little signals from my body</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10. I know more about taking care of my diabetes than anyone</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>11. I don’t dwell on having diabetes - it’s part of me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>12. Fitting diabetes into my daily activities is automatic for me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>13. I ‘tune in’ to things that my body is telling me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>14. I have settled into a comfortable routine with my diabetes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Cheri Ann Hernandez, 1994
APPENDIX VII

DATA TABLES
Table 2

Demographic Characteristics Regarding Gender, Age and Ethnicity

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender (N=22)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>90.9%</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>9.1%</td>
</tr>
<tr>
<td><strong>Age in years (N=22)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37 - 40</td>
<td>2</td>
<td>9.1%</td>
</tr>
<tr>
<td>41 - 50</td>
<td>5</td>
<td>22.7%</td>
</tr>
<tr>
<td>51 - 60</td>
<td>2</td>
<td>9.1%</td>
</tr>
<tr>
<td>61 - 70</td>
<td>7</td>
<td>31.8%</td>
</tr>
<tr>
<td>71 ≥</td>
<td>6</td>
<td>27.3%</td>
</tr>
<tr>
<td><strong>Ethnicity (N=22)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>19</td>
<td>86.5%</td>
</tr>
<tr>
<td>African American</td>
<td>1</td>
<td>4.5%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
<td>4.5%</td>
</tr>
<tr>
<td>No answer</td>
<td>1</td>
<td>4.5%</td>
</tr>
<tr>
<td><strong>Education (N=22)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 years (High School)</td>
<td>7</td>
<td>38.9%</td>
</tr>
<tr>
<td>13 - 16 years (Under Graduate)</td>
<td>8</td>
<td>44.4%</td>
</tr>
<tr>
<td>17 - 18 years (Graduate)</td>
<td>2</td>
<td>16.7%</td>
</tr>
</tbody>
</table>
Table 3

Demographic Characteristics Regarding Type of Diabetes, Years Diagnosed and Type of Medication Used.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Diabetes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Type 2</td>
<td>22</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Years Diagnosed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 11 months</td>
<td>13</td>
<td>59.2%</td>
</tr>
<tr>
<td>1 – 2 years</td>
<td>1</td>
<td>4.5%</td>
</tr>
<tr>
<td>3 – 5 years</td>
<td>2</td>
<td>9.1%</td>
</tr>
<tr>
<td>6 – 8 years</td>
<td>4</td>
<td>18.2%</td>
</tr>
<tr>
<td>9 – 12 years</td>
<td>1</td>
<td>4.5%</td>
</tr>
<tr>
<td>13 ≥</td>
<td>1</td>
<td>4.5%</td>
</tr>
<tr>
<td><strong>Type of Medication</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>5</td>
<td>22.8%</td>
</tr>
<tr>
<td>Pill</td>
<td>14</td>
<td>63.6%</td>
</tr>
<tr>
<td>Pill/Insulin</td>
<td>3</td>
<td>13.6%</td>
</tr>
</tbody>
</table>
Table 4

Descriptive Characteristics Regarding Checking Glucose Levels, Evaluating Feet, and Exercise

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check Glucose Level on Daily Basis (N=19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14</td>
<td>73.7%</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>26.3%</td>
</tr>
<tr>
<td>Evaluate Feet (N=22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>10</td>
<td>45.5%</td>
</tr>
<tr>
<td>Weekly</td>
<td>1</td>
<td>4.5%</td>
</tr>
<tr>
<td>Monthly</td>
<td>1</td>
<td>4.5%</td>
</tr>
<tr>
<td>Never</td>
<td>10</td>
<td>45.5%</td>
</tr>
<tr>
<td>Exercise (N=22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular/Weight training</td>
<td>3</td>
<td>13.6%</td>
</tr>
<tr>
<td>Walk</td>
<td>6</td>
<td>27.3%</td>
</tr>
<tr>
<td>Never</td>
<td>13</td>
<td>59.1%</td>
</tr>
</tbody>
</table>
NOTE TO USERS

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Table 6

**Level of Reported Integration of Diabetes**

<table>
<thead>
<tr>
<th>Perceived Integration</th>
<th>Mean Score</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living with diabetes taught me how diabetes affects my body</td>
<td>4</td>
<td></td>
<td>5.2*</td>
</tr>
<tr>
<td>I’m aware of my bodily cues telling me about my blood sugar</td>
<td>3.8</td>
<td></td>
<td>4.8*</td>
</tr>
<tr>
<td>I don’t mind telling people I have diabetes</td>
<td>4.8</td>
<td></td>
<td>4.9</td>
</tr>
<tr>
<td>I work to try to keep my blood sugar at a certain range</td>
<td>4.7</td>
<td></td>
<td>5.1</td>
</tr>
<tr>
<td>I know what to do if my blood sugar is too low/high</td>
<td>4</td>
<td></td>
<td>4.9</td>
</tr>
<tr>
<td>Living with diabetes teaches me to pay attention to my body</td>
<td>4.8</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>I can adjust my diabetes routine to fit most new situations</td>
<td>4</td>
<td></td>
<td>4.7</td>
</tr>
<tr>
<td>Living with diabetes has become natural for me</td>
<td>3.6</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>I take action based on little signals from my body</td>
<td>3.9</td>
<td></td>
<td>4.5</td>
</tr>
<tr>
<td>I know more about taking care of my diabetes than anyone</td>
<td>2.5</td>
<td></td>
<td>3.9*</td>
</tr>
<tr>
<td>I don’t dwell on having diabetes, it’s part of me</td>
<td>3.7</td>
<td></td>
<td>4.6</td>
</tr>
<tr>
<td>Fitting diabetes into my daily activities is automatic for me</td>
<td>3.3</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>I tune in to things that my body is telling me</td>
<td>3.9</td>
<td></td>
<td>4.5</td>
</tr>
<tr>
<td>I have settled into a comfortable routine with my diabetes</td>
<td>3.2</td>
<td></td>
<td>4.2</td>
</tr>
</tbody>
</table>

*Note* Based on the Likert Scale of the Diabetes Questionnaire (1 = Strongly Disagree, 2 = Moderately Disagree, 3 = Slightly Disagree, 4 = Slightly Agree, 5 = Moderately Agree, 6 = Strongly Agree).

* Indicates areas of Significance at p<.01
Table 7

Frequencies Regarding Overall Summation of Level of Integration of Diabetes

<table>
<thead>
<tr>
<th></th>
<th>Total Mean Score</th>
<th>Standard deviation</th>
<th>Significance at p.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>55.09</td>
<td>17.87</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>65.09</td>
<td>15.02</td>
<td></td>
</tr>
<tr>
<td>Total Pre/Posttest</td>
<td>60.09</td>
<td>15.02</td>
<td>.007</td>
</tr>
</tbody>
</table>

(2-tailed)
VITA

Graduate College
University of Nevada, Las Vegas

Tara McGill

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Committee Member, Dr. Cheryl Bowles, Ph.D.
Committee Member, Dr. Mary Reed, Ph.D.
Committee Member, Dr. Richard Tandy, Ph.D.