DIABETES EDUCATION GUIDE FOR PRIMARY CARE PROVIDERS IN MONTANA

by

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Connie Mae White

April 11, 2005

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ABSTRACT

This project addresses a perceived need for a Diabetes Education Guide for rural primary care providers in Montana. Little data specific to rural primary care provider diabetes teaching resources was available. This project was designed to provide rural primary care providers in Montana with a quick initial diabetes education resource. A Diabetes Education Guide using a pamphlet format was developed and sent to 50 rural primary care providers in Montana. Providers were asked to evaluate the Diabetes Education Guide by completing a six-question evaluation tool and by offering suggestions for improvement to the Diabetes Education Guide. Evaluation tool responses and suggestions for improvement were incorporated into a revised Diabetes Education Guide using a booklet format. Rural primary care provider evaluation responses supported the premise for a Diabetes Education Guide in the rural setting.

CHAPTER ONE

INTRODUCTION

Montana is 630 miles long and 280 miles wide and occupies 147,046 square miles (Montana Geography, 2004). In contrast, the population of Montana is currently estimated at 917,621 people, or less than six persons per square mile (U.S. Census Bureau, 2000). The vast area and sparse population of Montana present problems in delivery of health care services. Critical-access hospitals, often staffed with midlevel practitioners, and rural clinics serve small, rural communities. Health care providers are isolated and perform without the ancillary personnel or the support services available in larger urban areas. This is particularly significant in the treatment of individuals with diabetes who require extensive education and support systems to prevent the sequelae of the disease.

More than 53,000 people in Montana are diagnosed with diabetes. An estimated equal number of individuals have undiagnosed diabetes (Montana Diabetes Project, 2002). A study conducted by the American Diabetes Association, ranked Montana 38th out of the 50 states in access to resources for persons with diabetes (Montana Diabetes Project, 2002). The limitations of the health care delivery system in rural Montana necessitates that the primary care providers provide initial diabetes education for diabetic clients. Extensive education of an individual with diabetes empowers the individual with

self-management tools to prevent serious complications. The Diabetes Education Guide was developed to assist primary care providers with initial diabetes education requirements.

Problem Statement

Rural health care providers deliver initial diabetes education to individuals with a new diagnosis of diabetes mellitus without a support team of diabetes educators, podiatrists, dentists, ophthalmologists, or dietitians. Individuals in a rural setting must rely on the primary care provider to deliver initial diabetes education until access to a support network is attained.

Project Purpose

The purpose of this project is to develop a diabetes education tool to assist rural primary health care providers in delivering initial diabetes education.

Background and Significance

According to the Montana Diabetes Project (2002), the number of individuals in Montana with diabetes has increased from 40,000 in 1985 to 53,000 in 1995. It is estimated that the number of individuals with undiagnosed diabetes, if diagnosed, could double the number of individuals with diabetes. An aging population, increasing obesity among all age groups, and a sedentary lifestyle are risk factors for diabetes (Montana Diabetes Project, 2002).

Diabetes is a chronic progressive disease. Over an extended period, elevated blood sugar above the normal range can cause target organ damage that progresses to blindness, cerebrovascular disease, myocardial infarction, nephrosis, and neuropathies (Bill-Fleury, 2003). Monitoring blood sugar and maintaining it within a normal range require motivation and commitment from the individual with the disease. Extensive diabetes education is required to empower the client with diabetes to attain a degree of control over the disease.

Rural individuals with diabetes are at a disadvantage when accessing the health care system. The key concepts of distance, isolation, and lack of health care resources create barriers for rural individuals accessing health care services (Lee, Hollis, & McClain, 1998). Developing a support network and attaining extensive diabetes education may be delayed or deferred by a rural individual as a result of inherent barriers.

The National Rural Healthcare Association (1999) has compiled statistical data that supports Lee et al.'s research. While one-fourth of America's population reside in rural areas, only 10% of physicians practice in rural America. Cerebrovascular disease, hypertension, mental illness, and suicide rates are higher in rural populations, yet fewer health care providers, health care services, and health care facilities are available per capita to rural individuals (National Rural Healthcare Association, 1999). Continued cutbacks in Medicare payments to rural hospitals in the past two decades have led to the closure of over 470 rural hospitals, further compounding problems with accessibility to health care in rural areas (National Rural Healthcare Association, 1999).

The number of uninsured individuals is 20% greater in rural areas than in urban areas (National Rural Health Association, 1999). A higher percentage of self-employed individuals and small businesses and an agricultural economy account for the higher percent of uninsured individuals in rural areas (National Rural Health Association, 1999). There is also a higher percentage of elderly with Medicare coverage in frontier and rural areas. Low economic status, being uninsured, and being underinsured are factors in how and when an individual in a rural setting will seek medical care. Factors related to care and management of an individual with diabetes include low socioeconomic status, lack of insurance, distance to care, lack of trained diabetes support personnel, decreased Medicare reimbursement to providers, and less access to primary care providers and centers providing health care services (National Rural Health Association, 1999).

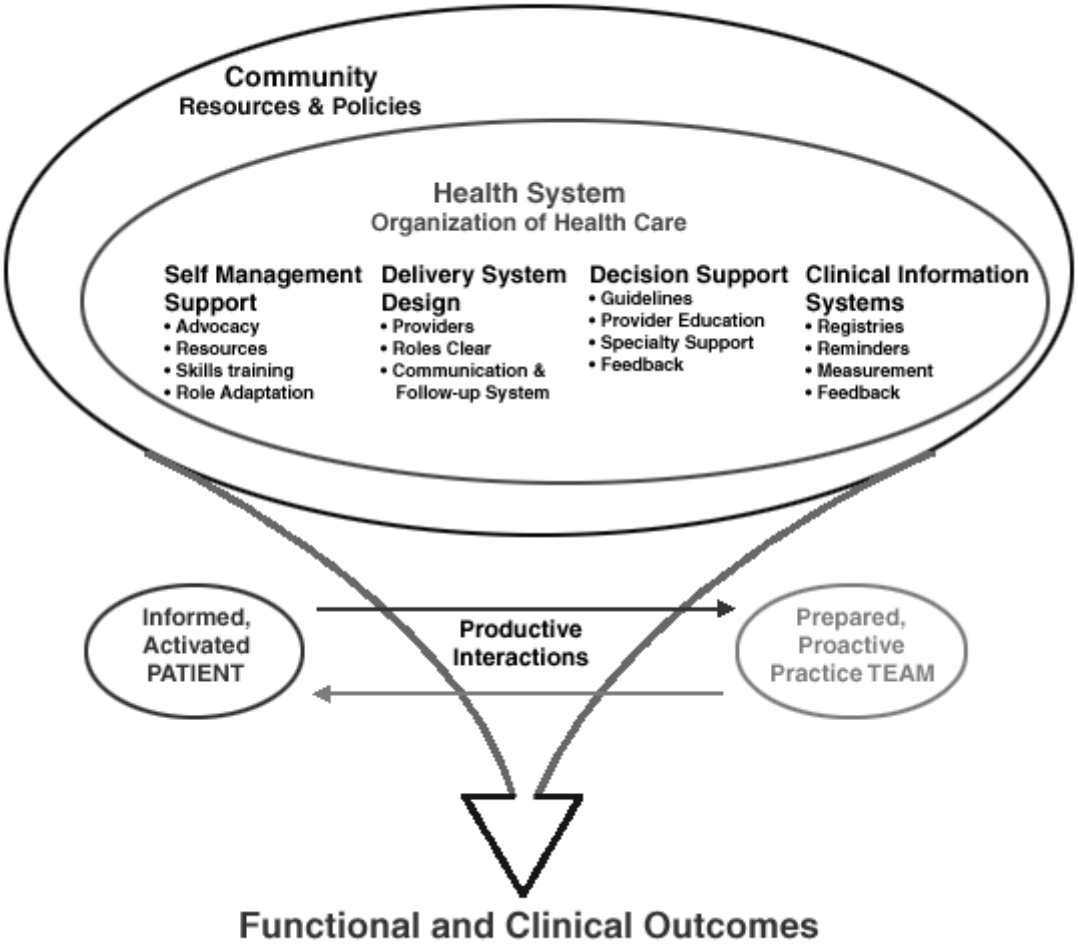
The problem of access to health care in the rural setting is magnified when providing health care to the individual with diabetes. Issues such as availability of health care services, time and distance to travel to health care services, lack of insurance, and higher levels of poverty among rural dwellers are deterrents to acquisition of health care services and health maintenance. These deterrents have a profound effect on management of diabetes and prevention of diabetes-related complications.

Conceptual Framework

A conceptual framework is used to guide the development of a study (Burns & Grove, 2001). The framework used for this project is the Chronic Care Model (2002). The Chronic Care Model identifies key elements critical to successful management of

chronic illnesses such as diabetes. Analyzing the complex nature of diabetes mellitus within the structure of the Chronic Care Model achieves a new approach to management of the disease and an extensive understanding of the complexities of the disease. Figure 1 provides an overview of the Chronic Care Model.

Figure 1. Chronic Care Model.



The Chronic Care Model integrates the essential elements of health care to produce quality outcomes for chronic disease management. By assuming a proactive approach to health care, as opposed to a reactive approach to health care, the model provides basic elements for transformation of health care systems at the community, organization, practice, and patient levels. All elements of the model work together to produce quality outcomes in management of diabetes mellitus.

At the community level, the model suggests mobilizing community resources to meet the needs of the individual with chronic disease. This may be accomplished by encouraging individuals to participate in established community programs, by coordinating with community organizations to develop new programs to fill gaps in needed services, and by advocating for policies to enhance patient care (Chronic Care Model, 2002). In small, rural Montana communities, this may be difficult because of a general lack of community resources and the distance required to travel to resources. The Montana Diabetes Project is attempting to address some of the issues of interest to rural Montana communities (Montana Diabetes Project, 2002).

The health care system or organization of health care requires leadership that will establish, as a priority, care improvement and translate it into goals and policies that will create comprehensive system change. Essential to system change are communication and data sharing between providers and settings, thereby facilitating management of chronic disease (Chronic Care Model, 2002). Rural primary care providers must establish a referral system and request data from colleagues and other relevant professionals to adequately assist in chronic disease management.

Ultimately, the management of chronic disease and outcomes of the disease are the responsibility of the individual with the disease. Acknowledging the central role of the individual in chronic disease management is essential to empowering and preparing the individual for the responsibility of self-management. By using collaborative effort, providers and individuals with chronic disease can establish goals, set priorities, define problems, create treatment plans, and solve problems that arise (Chronic Care Model, 2002).

A proactive approach to chronic disease management requires establishing care needs and defining tasks and roles to ensure care with structured, planned interactions. To do so necessitates change within the delivery system design, thereby transforming it from a reactive system to a proactive system. Changes required include follow-up as standard procedure, possible case management of individuals with complex chronic disease to optimize self-management, and health literacy and cultural sensitivity (Chronic Care Model, 2002). In recent years, Montana has attempted to address cultural issues related to chronic disease within the American Indian population.

Treatment of chronic disease needs to be based on guidelines supported by clinical research. Established guidelines provide decision support and, when shared with the individual with chronic disease, provide the basis for self-management of the disease. Integrating specialist care with primary care, as in management of diabetes, provides better chronic disease outcomes (Chronic Care Model, 2002). Treatment-of-diabetes guidelines are revised yearly according to current clinical research.

The Chronic Care Model also suggests establishing clinical information systems to facilitate care of individuals with chronic disease. These information systems would assist in coordination by providing follow-up reminders and summarizing data to track and plan care. While registries are integral to the Chronic Care Model for providing feedback, they do not impact education requirements of the individual with diabetes and they are therefore not discussed in detail in this paper.

In theory, when all elements of the Chronic Care Model come together, the result is an informed individual able to take an active role in management of his or her health and health care providers who are prepared and supported with time and resources (Chronic Care Model, 2002). The final outcomes are healthier individuals, health care provider satisfaction, and lower health care costs. Empowering the individual with diabetes through education and clinical support is the key to successful disease control.

Definitions

Rural

For the purpose of this project, *rural* is defined as any community outside of the major urban areas in Montana. The major urban areas include Billings, Great Falls, Bozeman, Missoula, Kalispell, and Helena.

Rural Primary Care Provider

For the purpose of this project, a *rural primary care provider* is defined as either a nurse practitioner or physician's assistant providing and coordinating health care in a rural Montana community.

Telemedicine

For the purpose of this project, *telemedicine* is defined as health care information sent or received to an individual via computer or fax or over the telephone.

Prestudy Assumptions

1. Rural individuals with diabetes experience barriers when accessing the health care system.
2. Rural health care providers are the main source of initial diabetes education.
3. Rural individuals with diabetes want to control their disease.
4. Rural health care providers will benefit from a Diabetes Education Guide.

CHAPTER TWO

LITERATURE REVIEW

The purpose of this project is to develop a Diabetes Education Guide for rural primary care providers in Montana. An extensive literature review of current research was conducted to guide and support the development of the Diabetes Education Guide. The Chronic Care Model was used as a framework for the literature review.

Rural Community

Community-based diabetes support networks vary greatly from rural community to rural community. Individuals with diabetes in rural communities often must seek support networks outside of the communities they live in. Little research was available on community-based diabetes support networks in rural Montana communities.

Rural communities have a unique set of characteristics. These characteristics are identified by Lee et al. (1998) in their extensive research on rural communities and barriers to health care. Lee et al. found availability of health care providers, distance to travel to health care services, time to travel to health care services, isolation, higher rates of poverty among rural dwellers, and lack of insurance to be deterring factors for rural individuals accessing the health care system (Lee et al., 1998). These factors are especially significant to a rural individual with a chronic disease such as diabetes.

Support networks may be formal or informal (Lee et al., 1998). Formal networks in rural communities may consist of organized community groups, church groups, social clubs, and school-associated groups. Informal networks may consist of family, friends, and acquaintances within the community structure. Informal networks are unique in the strength of interdependence and support provided to individuals in rural communities.

Community-based support for the individual with diabetes is a critical component in successful management of the disease. Financial resources for travel, time to travel, and distance to travel to outside support groups may prevent the individual with diabetes from attaining goals in management of the disease. The diabetes information contained in the diabetes teaching tool will assist in bridging the gap in services for the rural individual with diabetes.

Rural Health System

Diabetes is becoming a priority for health care systems as health care costs rise. Traditional health care systems were designed around the acute care model, which is symptom driven. The acute care model is not designed to meet the needs of the chronically ill. Comprehensive system change is needed to address disease outcomes of the individual with diabetes. The Chronic Care Model focuses on both outcomes and prevention of chronic illnesses (Chronic Care Model, 2002). It is organized around elements that improve patient outcomes. The four elements include self-management support, delivery system design, decision support, and clinical information systems.

These four components are ultimately designed to create productive interactions between the informed activated patient and prepared proactive practice teams.

Self-Management Support

Early diagnosis is important in diabetes management. The impetus behind treatment of the disease is improving metabolic control early in the disease to prevent or delay long-term complications associated with diabetes (Polonsky et al., 2003). Medical management is crucial in treatment of diabetes, but due to the nature of the disease the individual with diabetes must also be skilled in self-management (Polonsky et al., 2003). Methods to promote better self-care in the individual with diabetes have been studied. Polansky et al. (2003) found that successful self-management of the disease required significant time, commitment, and coordination with many health care professionals. The same study also found that medical management, combined with education and frequent follow-up by a nurse case manager, has been linked to better hemoglobin A1c control (Polonsky et al., 2003). Hemoglobin A1c level is an indicator for how well the disease is controlled, and it is a predictor of future disease complications (Alazri & Neal, 2003). The study linked involvement of the health care team to successful self-care behaviors.

The basis of self-management is education. However, research indicates other aspects such as social support, problem-solving skills, and physiological and personal psychosocial factors are also important determining factors of an individual's ability to self-manage diabetes (Hill-Briggs, 2003). The ability of the individual with diabetes to problem solve and thereby make appropriate adjustments to diabetes treatments and self-care regimens is critical (Hill-Briggs, 2003). Four components are identified in disease

self-management problem solving: problem-solving skill, problem-solving orientation, knowledge about the disease, and past experiences (Hill-Briggs, 2003). Three of these components are intrinsic to an individual with diabetes. Careful assessment by the clinical support team of these individual factors is necessary to assist the individual with diabetes in attaining the highest level of disease self-management the individual is able to achieve.

The psychology of problem solving in diabetes has been the focus of several studies. Researchers are attempting to develop problem-solving skills in the individual with diabetes. Studies have concluded that teaching problem-solving skills modifies the ability of the individual to form flexible plans for handling difficult situations (Schlundt, Flannery, Davis, Kinzer, & Pichert, 1999; Glasgow et al., 1991). While education was an important component of the studies, personal goal setting, social support, and coping strategies were all integral to development of problem-solving abilities in the individual with diabetes.

Self-management of diabetes requires an extensive support network. The burden of support for individuals with diabetes in rural areas often falls on family members and caregivers. Involvement of a caregiver or support person will benefit both the individual with diabetes and the health care provider by providing emotional support, facilitating compliance to complex treatment regimens, serving as a resource for the patient and the health care provider, assisting in identification of barriers to optimal care, promoting patient self-management, and providing transportation and financial assistance (Norris &

Olson, 2004). Including caregivers and support persons in the education process will better assist the individual with diabetes with self-management of the disease.

An individual with diabetes may also choose to access a computer or online support group. This method would require availability of a computer and some skill in using a computer. In a rural setting, online-generated community support groups could provide social interaction with other individuals with diabetes that may not exist in the community of residence. Online support groups are not limited by geography, social services, or community size (Barrera, Glasgow, McKay, Boles, & Feil, 2002). This method may not be a good choice for the elderly or individuals with impaired vision. However, it does provide a measure of control and convenience for the individual with diabetes. Online support can be accessed in the individual's time frame, and it can be accessed in a more convenient environment and location (Smith & Weinert, 2000).

Finally, the treatment of diabetes must be tailored to fit the individual's values and lifestyle (Funnell & Anderson, 2004). Traditionally, successful diabetes management has been measured by an individual's compliance to a prescribed therapeutic regimen (Funnel & Anderson, 2004). Developing a self-management plan tailored to the individual's priorities, goals, resources, culture, and lifestyle has been shown to increase success of disease self-management (Funnel & Anderson, 2004). By enabling the individual to make decisions about disease management and participate in goal setting, greater satisfaction with the treatment plan and greater participation in the treatment plan are achieved, thereby promoting successful disease self-management.

While the Diabetes Education Guide can serve as a reference for individuals with diabetes, it cannot replace social support or extensive diabetes education. All efforts must be made to provide the individual with knowledge about the disease, teach skills for self–management of the disease, and encourage self-care habits. Successful management of diabetes demands coordination, time, and commitment from many health care professionals. Psychosocial factors, physical abilities, and motivation of the individual with diabetes are all determining factors in successful diabetes self-management.

Delivery System Design

The rural health care provider functions as a generalist in many rural settings. A generalist provides all aspects of health care without support of specialists or ancillary personnel. Considering a team-based approach to diabetes care has been proven to improve outcomes; the rural primary care provider must be part of the support network of the individual with diabetes and may provide the client with referrals to support persons outside the community of residence.

In the past 20 years, as funding for health care systems has changed and health care delivery systems have changed, responsibility for care of individuals with diabetes has shifted from hospitals to primary care providers (Renders et al., 2001). This, together with the fact that less than 20% of individuals with diabetes see an endocrinologist for management of the disease, necessitates that the generalist have a broad knowledge base and resources for referencing when managing care for an individual with diabetes (Saudek, 2002).

One way to supplement primary health care provider efforts in managing the complexities of diabetes is through disease management programs or education programs for the individual with diabetes (Toscani, O'Connor, & Nash, 2001). Sponsors of education programs may include payors, employers, health care providers, and health care suppliers. Availability of these programs may be limited in a rural community and could require travel to a distant community to access the program.

The individual with diabetes who resides in a rural community is at a disadvantage when attempting to access the current rural health care system. Availability of education programs and access to clinical support persons within the community of residence may prevent the rural individual with diabetes from receiving optimal diabetes care and education. Time to travel, distance to travel, and financial resources of the individual with diabetes can also be factors (Lee et al., 1998).

Decision Support

The accepted Standards of Medical Care in Diabetes is updated yearly and published by the American Diabetes Association. It is intended to guide treatment goals and evaluate quality of care for individuals with diabetes (American Diabetes Association, 2004). Several studies have shown that primary care providers are not implementing these standards of care for treating individuals with diabetes (Coon & Zulkowski, 2002; Kirkman, Williams, Caffrey, & Marrero, 2002; Fain & Melkus, 1994). Researchers at the Centers for Disease Control and Prevention suggest several reasons for this phenomenon. Lack of adherence to the guidelines by health care providers may occur because providers are not aware of the guidelines or they do not understand the rational

behind the guidelines, or patients refuse or do not adhere to interventions for treatment of the disease. The most common reasons are lack of time to review screening guidelines, lack of time to carry out recommended procedures, lack of reimbursement, and lack of resources (Kirkman et al., 2002). In the rural health care setting, these reasons are compounded by the inherent characteristics of the rural health care delivery system.

Many primary care practices find little time for diabetes management. The increasing prevalence of type 2 diabetes indicates the numbers of individuals receiving treatment for the disease will increase. To provide good quality care, the primary care practitioner must develop a systematic, efficient approach to diabetes care (Barnes et al., 2004). Time pressures increase in a rural primary care setting when the provider must function in multiple roles. When a client is newly diagnosed with diabetes, the rural primary care provider also functions as the diabetes educator.

Many rural areas have a lack of local resources coupled with restricted access to specialists. Both characteristics place an individual with diabetes at risk for suboptimal quality of care. To prevent systemic complications of diabetes, close monitoring of blood sugar, hemoglobin A1c, renal function, blood pressure, and serum lipids, in conjunction with medication, is imperative. Having a group of provider specialists to refer to and assist with managing clients with diabetes is a component to establishing a team effort in care of the client with diabetes.

Clinical Information Systems

It is critical to have current useful data about patients and patient populations. Compiling the data is the first step to creating a registry that will provide practitioners

with information on performance and results of diabetes treatments. Montana has two diabetes registries. One registry is compiled by the Montana Diabetes Project (2002), which is funded in part by the Center for Disease Control. The other is kept by Indian Health Services and is specific to the Montana American Indian population (Montana Diabetes Project, 2002). Registries are effective, and they can provide important reminders for patients and health care providers. The scope of registries is limited in Montana. While registries are an important component of the Chronic Care Model, the focus of this project is education of the individual with diabetes. For the purpose of this project, registries will not be discussed in detail.

Informed Patient

Education of the individual with diabetes is a major component of disease management. A systematic review of 41 controlled trials concluded that patient education may improve self-management of diabetes and improve compliance to therapy. (Renders et al., 2001). Some modes of diabetes education include individual one-on-one teaching with a diabetes educator, group participation with a diabetes educator, community-based diabetes screening clinics, videotapes, and education provided through telecommunication modes such as telephone, fax, and computer.

Cost containment and resource availability for diabetes education in the rural primary care setting must be considered. While slightly greater improvements in glycemic control were shown with education delivered in an individual setting, group diabetes education is more cost effective and efficient, a fact that may outweigh the slight

improvement demonstrated with education delivered one on one (Rickheim, Weaver, Flader, & Kendall, 2002). Similarly, comparisons have been made with diabetes education delivered in person and diabetes education delivered via telecommunication modes. Both methods were found equally effective in improving glycemic control, and patient satisfaction was high in the group receiving education by telemedicine methods (Izquierdo et al., 2003). Group education would be financially practical in the rural setting but may not be available in the community of residence. Consideration must then be given to availability of an individual's personal resources to travel to a group setting.

While copious amounts of printed diabetes education materials exist, access to printed education materials in a rural setting may be limited. Telemedicine availability for education purposes in rural areas of Montana is a viable alternative to face-to-face contact with an instructor. Although the research is limited in scope, clinical outcomes and patient acceptability of telemedicine have been generally positive (Kaufman et al., 2003). Lower income and lower education levels in rural populations also have an adverse effect on telemedicine accessibility (Kaufman et al., 2003). Fewer individuals in rural areas own computers, and fewer individuals in rural areas are computer literate. The individuals that do own computers have higher incomes and education levels (Kaufman et al., 2003).

There are over 3 million websites listed under diabetes education on the World Wide Web. Sorting through all sites to obtain useful information is difficult for a computer-literate individual. For the elderly individual or computer-naïve individual, the task becomes overwhelming (Kaufman et al., 2003). A vast majority of individuals with

type 2 diabetes mellitus are elderly. Cognitive and usability barriers in regard to telemedicine methods of education are higher in the elderly population due to age-related declines in psychomotor skills, especially in the areas of hand-eye coordination and dexterity (Kaufman et al., 2003). Economic status of the rural elderly, time and resources to teach computer skills, and physical limitations prevent this mode of education from being an option in the rural elderly population.

Telephones have connected communities together for decades. However, prolonged use of this mode of communication is costly and labor intensive (Smith & Weinert, 2000; Piette, 2000). An innovative alternative to one-on-one contact using ordinary telephone lines is the use of a telehomecare system (Bowles & Dansky, 2002). The system can be used for education, for monitoring, and for providing social support. It does require special equipment. Based on the function of the system, it would be a good communication tool for health care professionals and rural clients with diabetes.

The community diabetes screening clinic is an informal mode of providing diabetes education. Early detection of diabetes preventing diabetes complications such as cardiovascular problems, visual problems, and neuropathies is well documented. Diabetes screening clinics provide an opportunity to disseminate information at an opportune time, thereby increasing follow-up rates of individuals with diabetes. Increasing community awareness of the health risks and sequelae of diabetes also creates greater community support for the individual with diabetes (Davidson, 2004).

Empowering the individual with diabetes is the goal of patient-centered diabetes education. Empowerment assists the individual with diabetes in maintaining an internal locus of control, and it facilitates self-care. An empowered individual with diabetes in conjunction with a prepared proactive support team will produce productive interactions.

CHAPTER THREE

METHODOLOGY

The purpose of this project is to create a Diabetes Education Guide for rural primary care providers in Montana. This project was designed to provide the rural primary care provider with an education tool for initial diabetes education. The project identified satisfaction and dissatisfaction with the prototype education guide. The sample population, steps of data collection, outline, and content of the education guide and evaluation tool are discussed in this chapter.

Sample

A convenience sample of 50 rural primary care providers was selected from the Provider Network Listing published by Blue Cross Blue Shield of Montana (June, 2003). A combination of both physician's assistants and nurse practitioners was selected for the sample. If both a nurse practitioner and physician's assistant were practicing in a community, then the nurse practitioner was chosen. Practitioners were excluded if they were listed under a specialty clinic such as Planned Parenthood. Primary care providers in the urban areas of Missoula, Bozeman, Great Falls, Billings, Helena, and Kalispell were not included in the sample. Urban areas were excluded on the premise of available diabetes education resources. Four of the 50 packets were returned by post as undeliverable. There were 33 responding providers after the three-week period.

Steps of Data Collection

1. A Diabetes Education Guide was developed using education modules from Lilly's pharmaceutical database, the Standards of Medical Care in Diabetes published by the American Diabetes Association, the American Dietetic Association website, the National Diabetes Education Program website, and the Center for Disease Control and Prevention website.
2. A six-question evaluation tool was developed. Each question was answered on a Likert scale ranging from one to five. The number 1 corresponded with "disagree" and 5 corresponded with "strongly agree."
3. A letter of introduction identifying the writer and the purpose of the project was designed.
4. A convenience sample of 50 rural primary care providers consisting of nurse practitioners and physician's assistants was selected from the Provider Network Listing of June 2003, published by Blue Cross Blue Shield of Montana.
5. Fifty packets containing (a) a letter of introduction (see Appendix A), (b) a Diabetes Education Guide (see Appendix B), (c) an evaluation tool (see Appendix C), and (e) a self-addressed, postage-paid envelope in which to return the evaluation form were sent to selected providers.
6. Selected providers were requested to return the evaluation form in the self-addressed, postage-paid envelope within three weeks of receipt.
7. Responses were evaluated and condensed into a table for ease of reviewing.

8. Provider feedback was implemented to make changes in the Diabetes Education Guide.

Instrument

Busy primary care practices often do not have the time to deliver detailed diabetes education or search for diabetes education materials (Barnes et al., 2004). The Diabetes Education Guide was constructed as a small, readily available teaching tool for rural primary care providers. It was therefore necessary to condense vast amounts of diabetes education material to include only basic diabetes education information. The purpose of the education guide was to serve as a reference to providers during initial diabetes teaching. Areas covered in the education guide were basic facts about diabetes, pathophysiology of diabetes, monitoring blood sugar and normal blood sugar ranges, diet recommendations, exercise recommendations, medications for blood sugar control, hypoglycemia and hyperglycemia symptoms, and treatment and complications of diabetes. Also included were online resources used in the development of the Diabetes Education Guide.

A Likert scale format was used to evaluate the Diabetes Education Guide in the clinical setting. Provider feedback was elicited using a six-question evaluation tool (see Appendix C). To validate the perceived need for a Diabetes Education Guide in the rural primary care setting, the responding providers were asked if the Diabetes Education Guide would be a helpful tool for initial diabetes teaching. Ease of reading and comprehension of the presented materials were also evaluated. Although the Diabetes

Education Guide was developed as a teaching guide for providers, literature identifies education as an important step to empowerment, and empowerment produces better self-management of the disease (Funnell & Anderson, 2004). Therefore, providers were asked to evaluate the teaching guide as a reference source for clients with diabetes.

Learning to achieving good control of diabetes involves large amounts of detailed education material. Initial teaching should cover the basics of achieving good control of the disease but necessitates some detail in presentation of the material. Providers were requested to evaluate the scope and detail of topics covered in the Diabetes Education Guide. The pamphlet format of the Diabetes Education Guide limited the amount of topic detail.

Accessibility of clinical diabetes support persons within the community of residence was evaluated. Research indicates that a team approach to self-management of the disease produces better disease outcomes and that education topics will be reinforced at several points of contact with different providers. The information was helpful with redesign of the education guide in determining the depth of detailed information the education guide should present. Providers were also asked to assess personal use of online websites to access diabetes education materials. The information was helpful in planning for dissemination of the final education guide and for future distribution of yearly updates to the education guide.

The last section was for suggestions. Input from providers was requested to implement improvements to content and format for the final draft of the Diabetes Education Guide. Survey answers and independent provider suggestions from responding

primary care providers provided invaluable material for improvements to the Diabetes Education Guide. However, not all suggestions were implemented in the improvement of the Diabetes Education Guide. All suggestions for improvement, if reiterated in two or more surveys, were considered and implemented.

CHAPTER FOUR

PROJECT OUTCOMES

The purpose of this project is to create a Diabetes Education Guide for rural primary care providers in Montana. This chapter analyzes primary care provider responses to the evaluation tool and condenses the responses into a table for ease of understanding. Positive common themes or satisfaction and suggestions for improvement are also included in this chapter.

Data Analysis

A total of 33 (n = 33) out of 46 providers who received a questionnaire responded to a six-question evaluation tool with answers ranging from “strongly agree” to “strongly disagree.” “Strongly agree” corresponds to the value of 5. “Agree” corresponds to the value of 4. “Neither agree nor disagree” correlates to a value of 3. “Agree somewhat” correlates to a value of 2. “Disagree” correlates to a value of 1. Responses are expressed as (n) number of responses to each answer selection and in terms of percent of responses in each answer selection. Table 1 condenses provider responses.

Over 80% (n = 28) of providers surveyed indicated the diabetes teaching tool would be a helpful teaching tool for clients with diabetes. This validated the perceived need for a Diabetes Education Guide for primary care providers in Montana. While 75% (n = 25) of providers surveyed thought the tool was easy to follow and understand, several comments were written that indicated improvements could be made to the format

and content of the education guide. Comments for improvement to the Diabetes Education Guide are also reflected in percentage of providers: 24% (n = 8) that would not give or may give the Diabetes Education Guide as a resource to clients with diabetes. The diabetes teaching tool was comprehensive enough for over 75% (n = 25) of responding providers, although some independent comments suggested the teaching tool might be too comprehensive for initial diabetes education. Of the providers surveyed, 51% (n = 17) had some access within the community to clinical support persons such as a diabetes educator, dietitian, podiatrist, and dentist. Regarding online resources, 39% (n = 13) of providers accessed websites for diabetes education materials, and 36% (n = 12) of providers did not access websites or accessed them only somewhat for diabetes education materials. This may be significant for yearly updates and redistribution of the Diabetes Education Guide.

Based on responses and comments provided by rural primary care providers in this survey, an education guide for diabetes education would be a useful tool for primary care providers in Montana. Many of responding providers did not have diabetes support persons readily accessible in the community of residence. As a result, the burden of responsibility for initial diabetes education falls on the primary care provider. The Diabetes Education Guide could provide a bridge for comprehensive diabetes education in the rural setting.

Table 1. Data analyses.

Providers (n=33)	Strongly agree 5		Agree 4		Neither Agree nor Disagree 3		Agree Somewhat 2		Disagree 1		Mean
	%	n	%	n	%	n	%	n	%	n	
Question											
This will be a helpful tool for diabetic clients.	39%	13	45%	15	3%	1	12%	4	0%	0	4.12
This teaching too is easy to follow and understand.	27%	9	48%	16	3%	1	12%	4	9%	3	3.73
I would give this tool to my diabetic clients as a reference source.	36%	12	21%	7	18%	6	18%	6	6%	2	3.70
The topics covered are comprehensive enough for initial teaching.	36%	12	39%	13	9%	3	12%	4	3%	1	3.94
My diabetic clients have access to clinical support persons.(dietician, dentist, podiatrist, diabetes educator).	33%	11	18%	6	9%	3	21%	7	18%	6	3.27
I access websites for diabetes education materials when providing diabetes education to my clients.	12%	4	27%	9	24%	8	24%	8	12%	4	3.03

Satisfaction

Twelve rural primary care providers indicated the diabetes teaching tool was a good, fast resource for initial diabetes teaching. Common themes were “well done”; “superior content”; “excellent for summary”; “very direct”; “very understandable”; “good, detailed, fast resource”; “very thorough job”; and “I would love more handouts.” Two comments contradicted one another. One provider suggested increasing the “attractiveness” of the teaching guide and one provider thought the teaching guide was good without graphics, stating, “There are actually a number of problems with graphics,”

Dissatisfaction / Suggestions for Improvement

Of those surveyed, 16 out of 33 rural primary care providers thought the print was too small for elderly clients and clients with visual changes due to diabetic retinopathy. One suggestion was to make the print larger. The idea was also presented to consider cassette tapes for the visually impaired client. Eight providers thought the reading level was too high. One provider suggested a fourth-grade reading level would be appropriate. Another provider suggested an eighth-grade reading level would be appropriate. Six providers thought that the teaching tool contained too much information for initial diabetes teaching. It was suggested that the information be divided into three separate pamphlets. Two providers wanted to include a section on follow-up exams such as hemoglobin A1c, foot exams, blood pressure, yearly vision exams, urine/creatinine levels, dental exams, comprehensive blood analysis, full physical exams, and yearly flu and pneumonia vaccinations. One provider thought the medication section was too

complex for the patient to follow and suggested the medication section be left out of the teaching tool. A suggestion was made to include a visit to the health care provider before initiating an exercise program.

CHAPTER FIVE

DISCUSSION

Introduction

The purpose of this project is to create a Diabetes Education Guide for primary care providers in Montana. The project addresses a perceived need for a Diabetes Education Guide for use in a rural primary care setting. This chapter includes a summary of the evaluation tool responses, limitations of the project, implications, and conclusion.

Summary of Evaluation Tool Responses

Rural primary care providers in Montana evaluated the Diabetes Education Guide pamphlet. Satisfaction with the content of education material contained in the Diabetes Education Guide exceeded dissatisfaction with the content. Dissatisfaction with the format of the Diabetes Education Guide pamphlet exceeded satisfaction with the format. Suggestions for improvement were incorporated into the final Diabetes Education Guide booklet (see Appendix D).

Less than half of responding rural primary care providers indicated using computer-accessed diabetes education materials. Little data is available indicating which World Wide Web sites or other computer-accessible diabetes education materials are used by rural primary care providers. Evaluation of accessed websites was outside the purpose of the project.

One-half of responding providers indicated having some clinical support network available in the community of residence. Yet 84% of responding providers indicated the Diabetes Education Guide would be a helpful tool for initial diabetes teaching, and 57% of responding providers indicated the Diabetes Education Guide would be a helpful resource for clients with diabetes. The given percentages provide support for the necessity for a diabetes teaching tool in the rural setting.

While 75% of responding providers indicated the education tool was easy to follow and understand, one must consider the education level of the individuals evaluating the education tool. Suggestions to lower the reading level to an eighth-grade level were implemented in the final draft of the teaching tool. An attempt was made to not oversimplify the language of the teaching tool in consideration of the segment of population with a higher reading level.

Limitations

The intent of this project was to create a small but comprehensive teaching tool. The size of the diabetes education pamphlet limited the print size and volume of information contained in the Diabetes Education Guide. A booklet format was adopted for the final version to allow for larger print and space between topics. Yearly updates in standards of care necessitates that the Diabetes Education Guide be updated yearly in accordance to standards of care to remain a viable resource to rural providers. Funding for yearly updates and redistribution of the yearly updated Diabetes Education Guide to rural primary care providers also poses a problem.

Implications

Little research exists in the rural primary care setting to validate the need for a Diabetes Education Guide for use in rural primary care. More data on resources that rural primary care providers are using for diabetes education materials and how providers access the education material would provide valuable information for determining positive outcomes for the individual with diabetes. Data on correlation between diabetes education, rates of follow-up, and positive client outcomes in the rural setting are also needed.

The researcher's target population for this project was rural primary care providers in Montana. When responding provider improvement suggestions for the Diabetes Education Guide were implemented, the audience expanded to include the individual with diabetes, elderly individuals with diabetes, and visually impaired individuals. The Diabetes Education Guide could provide an important communication tool for provider and client by delineating goals for effective client self-management of diabetes. If the teaching tool is updated yearly according to standards of care, it can serve as a tool to promote provider adherence to standards of care when treating an individual with diabetes.

Conclusion

By implementing provider-suggested improvements to the education guide, an education guide was designed that could be used with an expanded population group, efficacy in delivery of education material was improved, and pertinent information for

follow-up was included. To accommodate feedback suggestions, the pamphlet was reformatted into a booklet. The challenge was in keeping the Diabetes Education Guide small yet enlarging the print and adding a section for follow-up exams. Diabetes treatment regimens can be complicated, and medication management can be inhibiting. The medication section was included in the revised education guide to provide a reference for those individuals taking medication to control the disease. By enlarging the print and spacing the sections, the researcher attempted to overcome the initial reaction to the amount of information provided in the education guide. Wording of the pamphlet was also changed to correspond to an eighth-grade reading level. A comment about consulting with the health care provider before starting exercise was included in the exercise portion of the booklet.

Many good diabetes education resources are available. The National Diabetes Education program, the American Diabetes Association, and multiple pharmaceutical companies publish and disseminate diabetes education materials. The extent and availability of diabetes education materials in rural Montana primary care settings is not known. The Diabetes Education Guide was conceived with the intent of providing a fast, easily available reference to the primary care provider and the individual with diabetes. The Diabetes Education Guide could be an integral part of initiating productive interactions between the primary care provider and the individual with diabetes. The teaching guide may serve as a reference for the primary care provider. It could also be a

tool that will empower the individual with diabetes and promote self-management of the disease. It is not intended to replace the extensive education required to successfully manage the disease for optimal life outcomes.

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APPENDICES

APPENDIX A

PARTICIPANT LETTER

Connie White
310 Heather Lane
Great Falls, MT
59405

April 9, 2004

Dear Healthcare Provider,

You are being asked to participate in an evaluation of the enclosed diabetes education tool. I am evaluating this teaching tool as partial fulfillment of my Master of Nursing Degree at Montana State University College of Nursing.
Please return the evaluation tool form in the stamped self-addressed envelope within three weeks of receiving it. Thank you for choosing to participate in evaluation of this education tool.

Sincerely,

Connie White, BSN, RN

APPENDIX B

DIABETES EDUCATION GUIDE

2004

Diabetes Mellitus Type 2

Education Guide

Basics

- There is no cure for diabetes. The goal of treatment is to keep blood sugars at healthy levels over the lifespan through diet, exercise and medication.
- Diabetes requires self-management and the support of a team of health care professionals trained to assist you in management of your diabetes.
- Diabetes is dynamic. It changes throughout the lifespan thus requiring changes in management.

Your Body and Diabetes

- Food is changed to a simple sugar called glucose. Glucose is needed by the body's cells to produce energy. Glucose is carried by the blood to the cells. The pancreas produces the hormone insulin. Insulin assists the body's cells in changing glucose to energy. In type 2 diabetes the body's cells become resistant to insulin or the pancreas does not produce enough insulin. This results in high levels of glucose in the blood and starvation of the body's cells.

Controlling Diabetes

- Daily monitoring of blood sugars is required to determine effective management of diabetes. You will use a glucometer to test blood sugar. Several types of glucometers are available. Discuss your options with your health care provider. Good blood sugar ranges are as follows:
  - 80 – 120 mg/dl on waking and before meals
  - 180 mg/dl or less two hours after meals
  - 100 - 140 mg/dl at bedtime
- A blood test called hemoglobin A1C will be done every three to six months depending on treatment goals. This test reflects the average levels of blood sugar over the past 12 weeks. It is a more accurate determinant of treatment efficacy than daily blood sugar monitoring. The American Diabetes Association recommends levels of hemoglobin A1C less than 7 %.

Diet

Diet and exercise are the cornerstones of diabetes control. Your health care provider will recommend a diabetes dietician to assist you with a healthy diet plan. Following the Food Guide Pyramid is a basic guide to choosing healthy foods. It recommends:

- 6 – 11 daily servings bread, cereal, rice and pasta
- 3 – 5 daily servings vegetables
- 2 – 4 daily servings fruit
- 2 – 3 daily servings milk, yogurt, cheese
- 2 – 3 daily servings meat, fish, poultry, eggs, nuts
- Use sparingly fats, oils, refined sugars

Points to Remember:

Eat a variety of foods from all the food groups

- Eat fruits and vegetables. They are high in vitamins, minerals and fiber.
- Choose food low in fat, saturated fat and cholesterol. Fat intake should not exceed 25 % of total calories.
- Eat foods with low sodium (salt).
  - Avoid processed foods, canned foods, boxed foods and frozen foods. These foods are higher in salt than foods "close to nature".
  - Use herbs, spices and low salt seasoning mixes for flavor.
  - Use sugar in moderation.
  - Use alcohol in moderation. It can lower blood sugar to dangerous levels in people taking diabetes medications.
  - Keep a food log of what you eat and portion size.

Exercise

- Exercise helps insulin work better if your body's cells are insulin resistant. It will also reduce stress, increase energy, increase strength and help control blood pressure and blood fats, i.e. cholesterol. Your exercise program will include:
    - Flexibility exercises such as stretching and yoga.
    - Strengthening or weight bearing such as weight lifting.
    - Aerobic activities such as dancing, walking, swimming or bike riding to burn calories and strengthen heart muscle.

  You and your health care provider will establish the level and type of exercise you should start at. The goal is 30 minutes of physical activity 5 days a week. Please consult your healthcare provider before beginning an exercise program.
- Tips
    - Finding someone to exercise with will keep it fun and keep you motivated
    - Increase physical activities in your daily routine by walking or biking instead of driving or climbing stairs instead of riding the elevator.

Diabetes Medications

- Treatment Stages
    1. Exercise, diet control
    2. Oral medication
    3. Combination of oral medications
    4. Insulin injections with oral medication
    5. Combination of types of insulin injections

Medications to control blood sugars include both oral and injectable medication. Examples of oral diabetes medications are

- Glyburide and glipizide. These medications help the pancreas provide extra insulin.
- Acarbose. This medication slows down digestion and absorption of starches and sugars.
- Metformin. Prevents the liver from excreting extra sugar when it is not needed.
- Proglitazone. Treats insulin resistance by making the cell more sensitive to insulin.

Injectable diabetes medications include insulin products. Most people with type 2 diabetes will eventually need to take insulin to control blood sugar levels. Type and amount of insulin your body needs is determined by

- Body weight
- Fat to muscle ratio or body build
- Physical activity
- Food intake
- Medications that effect insulin
- Stress or emotions
- General health

Hypoglycemia may result if blood sugar falls below 70 mg/dl. Low blood sugar is a serious condition. It will not go away without treatment. You may experience

- Feeling shaky
- Sweating
- Feeling tired
- Feeling hungry
- An increase in heart rate
- Feeling crabby or confused
- Blurred vision or headache
- Loss of consciousness

Or you may not have any symptoms.

If you have a blood sugar below 70 mg/dl with or without any of the above symptoms treat with

- 3 glucose tablets
- or ½ cup fruit juice or regular soda pop
- or 6 – 7 hard candies not sugar free
- or 1 tablespoon honey or sugar

After eating or drinking something retest your blood in 15 minutes. If you do not feel better after 15 minutes eat or drink something with sugar in it. Retest blood sugar. Be sure to record low blood sugar reaction in your blood sugar logbook.

- If blood sugar is still below 70 mg/dl call your health care provider.
- If mealtime is more than 1 hour away follow sugar intake with carbohydrate and protein such as ½ peanut butter sandwich or crackers and cheese.
- Eat your next meal as planned.

Prevent hypoglycemia by

- Eating meals on time
- Not skipping meals or snacks
- Adjusting food and medication to amount of exercise.
- Taking the correct amount of medication.
- Avoiding alcoholic beverages.
- Testing blood sugar at the right times.
- Test blood sugar if you do not feel normal.

Hyperglycemia or high blood sugar is a result of consistently elevated blood sugar. Some things that cause elevated blood sugars are

- Food
- Stress and emotions
- Illness
- A decrease in amount of exercise
- Taking the wrong amount or type of diabetes
- Taking over-the-counter or prescribed medications that elevate blood sugar

The best prevention for hyperglycemia is regular blood sugar testing. Uncontrolled diabetes or consistently high blood sugars results in complications or target organ damage.

Complications of Diabetes

Diabetes affects every organ system of the body. It damages both large and small blood vessels. Common complications of diabetes are:

- Stroke and heart disease – large vessel damage
- Frequent infections – small vessel damage
- Neuropathy or damage to nerves – small vessel damage
- Peripheral vascular disease or damage to small blood vessels
- Kidney damage – small vessel damage
- Eye disease – small vessel damage

You are at an increased risk for heart disease and stroke if you have elevated blood fats, high blood pressure and high blood sugar levels. Daily control of blood sugar, harmful cholesterol or LDL levels below 100, and blood pressures below 130/80 will help minimize your risk of heart disease. Your health care provider will do a blood test for blood fats on a regular basis. Blood pressure will be monitored at each health care provider visit.

Frequent Infections

- Frequent infections occur when circulation is impaired thereby reducing the amount of oxygen delivered to tissues. You are at a greater risk of developing skin infections, bladder infections, vaginal yeast infections, tooth and gum infections and getting the flu.
- A yearly flu shot in recommended.
- Basic good skin scare includes frequent bathing with mild soap and lukewarm water, moderate use of lotions, avoiding sunburn with use of sunscreen, keeping cuts, scrapes and injuries clean (call your health care provider if they do not heal).
- Dental care includes regular dental check ups at least every 6 months and brushing and flossing daily.

Neuropathy or Nerve Damage

- You may have developed neuropathy or nerve damage if you have

  - Burning pain, numbness or tingling or loss of felling in your feet or legs, especially at night
  - Problems in sexual functioning
  - Changes in bowel habits

Nerve cells swell and scar when blood sugar is elevated thereby limiting their ability to transmit signals to and from the brain.

A combination of nerve damage, blood circulation, and decreased ability to fight infections can make problems with your feet serious. Yearly visits to a podiatrist are recommended. Tips to keep your feet healthy:

- Check feet daily for ingrown toenails, redness, swelling or open areas in the skin.
- Cut toenails straight across and smooth with an emery board.
- Wear comfortable, good fitting shoes and inspect them for rough spots and foreign objects daily.
- Avoid going bare foot especially outdoors.
- Take extra care to protect your feet from extreme hot or cold.

Kidney Disease

- Kidney disease occurs when small blood vessels in the kidney are damaged by elevated blood sugar. Functional damage will result in a decreased ability to filter impurities from the blood. Notify your health care provider immediately if you experience
  - Flank pain
  - Difficulty urinating
  - Burning with urination
  - Blood-tinged urine
  - Urgency to urinate

  Kidney dialysis and kidney transplant may be necessary. Your health care provider will order a microalbumin urine screen at least yearly to monitor kidney function.

Eye Disease

Small vessels in the eyes can become blocked or break thereby affecting your ability to see. If detected early, eye damage or retinopathy can be corrected with laser surgery. A dilated eye exam by an optometrist or ophthalmologist is recommended yearly for prevention of diabetes-induced blindness. If you have any of the following symptoms see your eye doctor immediately.

- Blurred or double vision
- Narrowed fields of vision
- Dark spots, or sudden loss of vision
- Pain or pressure in the eyes
- Unusual difficulty focusing in dim light

*If you smoke – quit. Smoking multiplies your risk of diabetes-related complications. Your health care provider will be happy to discuss methods to assist with smoking cessation.

Online Resources

- American Diabetes Association
  1-800-DIABETES or www.diabetes.org
- American Dietetic Association
  1-800-877-1600 or www.eatright.org
- National Diabetes Education Program
  1-800-860-8747 or http://ndep.nih.gov
- Centers for Disease Control and Prevention
  Division of Diabetes Translation
  1-877-232-3422 or www.cdc.gov/diabetes
  Click on "State-based Programs" for information on government contacts in your state.
- Lilly Pharmaceuticals
  http://www.lillydiabetes.com

APPENDIX C

EVALUATION TOOL

Evaluation Form

	Strongly Agree	Agree	Neither Agree nor Disagree	Agree Somewhat	Disagree
This will be a helpful teaching tool for diabetic clients.	5	4	3	2	1
This teaching tool is easy to follow and understand.	5	4	3	2	1
I would give this tool to my diabetic clients as a reference source.	5	4	3	2	1
The topics covered are comprehensive enough for initial teaching.	5	4	3	2	1
My diabetic clients have access within their community to clinical support persons. (dietician, dentist, podiatrist, diabetes educator)	5	4	3	2	1
I access websites for diabetes education materials when providing diabetes education to my clients.	5	4	3	2	1

Suggestions:

APPENDIX D

DIABETES EDUCATION BOOKLET

2005

Diabetes

Education

Guide

Diabetes Basic Facts

- There is no cure for diabetes. The goal of treatment is to keep blood sugars at healthy levels over the lifespan through diet, exercise and medication.
- Diabetes requires self-management and the support of a team of health care professionals trained to assist you in management of your diabetes.
- Diabetes changes throughout the lifespan and will require changes in management of the disease.

Diabetes and Your Body

- Food is converted to a simple sugar called glucose. Glucose is required by the body's cells to produce energy. Blood carries glucose to the cells. The pancreas produces the hormone insulin, which assists the body's cells in converting glucose to energy. In type 2 diabetes the body's cells become resistant to insulin or the pancreas does not produce enough insulin. This results in high levels of glucose in the blood and starvation of the body's cells.

Controlling Diabetes

- Daily monitoring of blood sugars is required to determine effective management of diabetes. You will use a glucometer to test blood sugar. Several types of glucometers are available. Discuss your options with your health care provider. Good blood sugar ranges are as follows:

  - 90 – 130 mg/dl on waking and before meals
  - 180 mg/dl or less two hours after meals
  - 100 - 140 mg/dl at bedtime

- A blood test called hemoglobin A1C will be done every three to six months depending on treatment goals. This test reflects the average levels of blood sugar over the past 12 weeks. Hemoglobin A1C levels show us how effective the treatment has been over the past 12

weeks. The American Diabetes Association recommends levels of hemoglobin A1C less than 7.

Diet

- Diet and exercise are the cornerstones of diabetes control. Your health care provider will recommend a diabetes dietician to assist you with a healthy diet plan. USDA Dietary Guidelines recommend the following for a 2000 calorie per day diet

- 3 or more ounces of whole grains per day
- 2 ½ cups of fruit per day
- 2 cups of vegetables per day
- 3 cups of fat free/low-fat milk products per day
- 5.5 ounces of lean meats and beans per day

Use sparingly fats, oils, refined sugars

Points to Remember:

Eat a variety of foods from all the food groups

- Eat fruits and vegetables. They are high in vitamins, minerals and fiber.
- Choose food low in fat, saturated fat and cholesterol. Fat intake should not exceed 20 - 35 % of total calories.
- Eat foods with low sodium (salt).
    - Avoid processed foods, canned foods, boxed foods and frozen foods. These foods are higher in salt than foods "close to nature".
    - Use herbs, spices and low salt seasoning mixes for flavor.
    - Use sugar in moderation.
    - Use alcohol in moderation. It can lower blood sugar to dangerous levels in people taking diabetes medications.
    - Keep a food log of what you eat and portion size.

Exercise

- Exercise helps insulin work better if your body's cells are insulin resistant. It will also reduce stress, increase energy, increase strength and help control blood pressure and blood fats, i.e. cholesterol. Your exercise program will include:

    - Flexibility exercises such as stretching and yoga.
    - Strengthening or weight bearing such as weight lifting.
    - Aerobic activities such as dancing, walking, swimming or bike riding to burn calories and strengthen heart muscle.

  You and your health care provider will establish the level and type of exercise you should start at. The goal is 30 minutes of physical activity above usual activities 5 days a week.

- Tips

    - Finding someone to exercise with will keep it fun and keep you motivated
    - Increase physical activities in your daily routine by walking or biking instead of driving or climbing stairs instead of riding the elevator.

Diabetes Medications

- Treatment Stages
    1. Exercise, diet control
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- Food intake
- Medications that effect insulin
- Stress or emotions
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Hypoglycemia may result if blood sugar falls below 70 mg/dl. Low blood sugar is a serious condition. It will not go away without treatment. You may experience

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- Eat your next meal as planned.

Prevent hypoglycemia by

- Eating meals on time
- Not skipping meals or snacks
- Adjusting food and medication to amount of exercise.
- Taking the correct amount of medication.
- Avoiding alcoholic beverages.
- Testing blood sugar at the right times.
- Test blood sugar if you do not feel normal.
-

Hyperglycemia or high blood sugar is a result of consistently elevated blood sugar. Some things that cause elevated blood sugars are

- Food
- Stress and emotions
- Illness
- A decrease in amount of exercise
- Taking the wrong amount or type of diabetes medication
- Taking over-the-counter or prescribed medications that elevate blood

sugar

The best prevention for hyperglycemia is regular blood sugar testing. Uncontrolled diabetes or consistently high blood sugars results in complications or target organ damage.

Complications of Diabetes

Diabetes affects every organ system of the body. It damages both large and small blood vessels. Common complications of diabetes are:

- Stroke and heart disease – large vessel damage
- Frequent infections – small vessel damage
- Neuropathy or damage to nerves – small vessel damage
- Peripheral vascular disease or damage to small blood vessels
- Kidney damage – small vessel damage
- Eye disease – small vessel damage

Heart Disease and Stroke

You are at an increased risk for heart disease and stroke if you have:

- Elevated blood fats
- High blood pressure
- High blood sugar levels

Daily control of blood sugar, harmful cholesterol or LDL levels below 100, and blood pressures below 130/80 will help minimize your risk of heart disease. Your health care provider will do a blood test for blood fats on a regular basis. Blood pressure will be monitored at each health care provider visit.

Frequent Infections

- Frequent infections occur when circulation is impaired thereby reducing the amount of oxygen delivered to tissues. You are at a greater risk of developing skin infections, bladder infections, vaginal yeast infections, tooth and gum infections and getting the flu.

- A yearly flu shot in recommended.
- Basic good skin scare includes frequent bathing with mild soap and lukewarm water, moderate use of lotions, avoiding sunburn with use of sunscreen, keeping cuts, scrapes and injuries clean (call your health care provider if they do not heal).
- Dental care includes regular dental check ups at least every 6 months and brushing and flossing daily.

Neuropathy or Nerve Damage

- You may have developed neuropathy or nerve damage if you have

    - Burning pain, numbness or tingling or loss of feeling in your feet or legs, especially at night
    - Problems in sexual functioning
    - Changes in bowel habits

Nerve cells swell and scar when blood sugar is elevated thereby limiting their ability to send signals to and from the brain.

- A combination of nerve damage, blood circulation, and decreased ability to fight infections can make problems with your feet serious. Yearly visits to a podiatrist are recommended.

Tips to keep your feet healthy:

- Check feet daily for ingrown toenails, redness, swelling or open areas in the skin.
- Cut toenails straight across and smooth with an emery board.
- Wear comfortable, good fitting shoes and inspect them for rough spots and foreign objects daily.
- Avoid going bare foot especially outdoors.
- Take extra care to protect your feet from extreme hot or cold.

Kidney Disease

- Kidney disease occurs when small blood vessels in the kidney are damaged by elevated blood sugar. Functional damage will result in a decreased ability to filter impurities from the blood. Notify your health care provider immediately if you experience

    - Flank pain
    - Difficulty urinating
    - Burning with urination
    - Blood-tinged urine
    - Urgency to urinate

  Kidney dialysis and kidney transplant may be necessary. Your health care provider will order a micro-albumin urine screen at least yearly to monitor kidney function.

Eye Disease

Small vessels in the eyes can become blocked or break thereby affecting your ability to see. If detected early, eye damage or retinopathy can be corrected with laser surgery. A dilated eye exam by an optometrist or ophthalmologist is recommended yearly for prevention of diabetes-related blindness. If you have any of the following symptoms see your eye doctor immediately.

- Blurred or double vision
- Narrowed fields of vision
- Dark spots, or sudden loss of vision
- Pain or pressure in the eyes
- Unusual difficulty focusing in dim light

***If you smoke – quit**. Smoking multiplies your risk of diabetes-related complications. Your health care provider will be happy to discuss methods to assist you to stop smoking.

Follow Up:

Daily:

- Test your blood sugar and record it in a logbook.
- Take your medications.
- Keep a record of foods you eat.
- Check your feet.
- Take care of your skin and teeth.

Every 3 months at health care provider visit:

- Bring your blood sugar logbook with you.
- Have your health care provider take your blood pressure.
- Have your health care provider do a hemoglobin A1C blood test.
- Have your health care provider check your feet.

Once a year:

- Have an eye exam.
- Have your feet checked by a podiatrist (foot Dr.)
- Have your urine checked for protein (micro-albumin).
- Have a lipid blood test.

Online Resources

- American Diabetes Association
  1-800-DIABETES or www.diabetes.org
- American Dietetic Association
  1-800-877-1600 or www.eatright.org
- National Diabetes Education Program
  1-800-860-8747 or http://ndep.nih.gov
- Centers for Disease Control and Prevention
  Division of Diabetes Translation
  1-877-232-3422 or www.cdc.gov/diabetes
  Click on "State-based Programs" for information on government contacts in your state.
- Lilly Pharmaceuticals
  http://www.lillydiabetes.com