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The Effect of Shared Medical Appointments and Education on Hemoglobin A1C Levels

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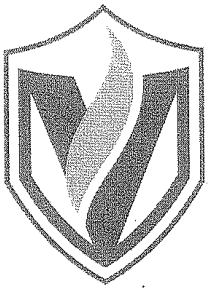
SHARED MEDICAL APPOINTMENTS 1



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THE EFFECT OF SHARED MEDICAL APPOINTMENTS AND EDUCATION ON HEMOGLOBIN A1C LEVELS

by

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EVIDENCE-BASED PRACTICE PROJECT REPORT

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DEDICATION

This project is dedicated to my family that has supported me throughout my life including this journey. To my Dad and Mom: we have not always been in agreement, I know I am who I am, because of you. To my sister Julie who has always been there to pick up loose ends in my life; and helps me when I was just too tired. Most of all this dedication is to my children and husband. Robert and Alexandrea: thank you for loving me unconditionally and understanding my absences physically and mentally during many hours of working on school and homework. One day not too long ago when I wanted to quit, my daughter told me, “Mom you have never quit anything, which has developed my foundation in life and what I live by”, this gave me the strength to carry on. To my husband Rob, I love you so much for being my rock. You have always been at my side through, long hours of me tuning you out, all the tears you wiped away, and all the hugs you gave me without saying a word. For all my family, thank you for believing in me when I did not believe that I could take the next step.

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Abstract

Type II diabetes affects millions of people worldwide. Approximately 25.8 million or 8.3 percent of the United States (U.S.) population has type II diabetes. The number of adults in the United States developing diabetes has been projected to double by the year 2030 (World Health Organization, 2013). Diabetes is the leading cause of kidney failure and blindness, as well as the major cause of heart disease and stroke which is the 7th leading cause of death in the U.S. The purpose of this evidence-based project was to determine the effects of education during shared medical appointments with type II diabetic patients, aged 18-75. Hemoglobin A1C levels were compared from the initial shared medical appointment, when education was provided, to the follow-up shared medical appointment three months later. The Chronic Care Model was utilized to guide this intervention. Referral to this project was from health care providers within a family practice in Marshall County Indiana. Twenty Participants (N = 20) completed the shared medical appointments. The data were analyzed through descriptive statistics, paired sample *t*-tests and Wilcoxon statistics. Hemoglobin A1C levels were the primary outcome measures. A statistical significant difference was found in hemoglobin A1C (SD = .803, p = .000) between the initial and follow-up measures. Significant additional findings included these changes: (a) body mass index (BMI) (p = .001), (b) systolic blood pressure (p = .484), (c) diastolic blood pressure (p = 0.064), (d) total cholesterol ($p = 0.015$), and (e) low-density lipoprotein (LDL) (p = .001) as a result of the educational intervention. This evidence-based project had positive outcomes that replicated what has been found in the literature on hemoglobin A1C levels when education was provided during shared medical appointments. The application of findings has been presented to providers in the family practice where the intervention was completed. Shared medical appointments have been adopted by the clinical agency as a valuable asset and program that will be initiated in diabetes care.

CHAPTER 1

INTRODUCTION

Management of chronic illness has become the focus of health care today. Individuals are living longer in the presence of chronic disease such as diabetes, hypertension, coronary disease, kidney failure and obesity. According to the World Health Organization (WHO), it has been estimated that the number of adults in the United States that will develop diabetes will double by the year 2030 (World Health Organization, 2013). Chronic disease in today's health care system and re-imbursements focuses on patient satisfaction, patient outcomes and quality of life. Evidence-based practice (EBP) is essential to healthcare in regards to the value of high quality care and patient outcomes (Melnyk & Fineout-Overholt, 2011). Evidence indicates there is a significant need for diabetes education to improve patient outcomes as well as prevention of complications. Shared medical appointments (SMA) are an alternative to one-on-one office appointments that are a cost-effective way to provide both diabetes medical management and self-care education in the same visit. SMAs deliver diabetic education that improves patient outcomes as well as using group interaction to increase knowledge and self-care skills (Hodorowicz, 2012).

The terms "shared medical appointment" and "group medical appointments" are generally used interchangeably. According to Ridge (2012), shared medical appointments "focus on educational interventions that can lead to behavioral changes through cognitive and behavioral strategies to enhance coping and problem-solving" (Ridge, 2012, p. 73). Currently, there is not a universal model for SMAs, yet this model is generally used in health maintenance organizations by integration of education. The objectives of SMAs are to encourage patients in self-management skills, during peer interaction and support. In addition, patients are able to identify barriers to self-care; as well as learn skills to overcome barriers. SMAs have two components: one-on-one examinations by a health care provider and a group session in which participants interact together on managing diabetes and learning self-care behaviors. According

to Hodorowicz (2012), shared medical appointments are designed to: (1) maximize the use of limited resources, (2) better manage patient care workload, (3) increase productivity without increasing work hours, (4) manage providers busy practices more efficiently, (5) address the ongoing needs of patients with chronic diseases such as diabetes, (6) increase the face-to-face time between providers and patients, and (7) increase patients' involvement in their own care while improving patient satisfaction.

Background

Type II diabetes was the primary focus of this EBP project. Type II diabetes has become a chronic illness that affects millions of Americans every day and costs billions to the health care system. Type II diabetes is more prevalent than type I, and over 90% of all diabetic patients have type II. Decades ago, literature indicated that type II diabetes occurred over the age of 40. More recently, due to unhealthy lifestyle and obesity, teenagers are developing diabetes (U.S. Department of Health and Human Services, 2012). Health care providers have focused on prevention and management of type II diabetes as well as prolong the onset of the associated complications.

Diabetes involves many different systems and organs in the body. The major problem with type II diabetes is not the lack of insulin but the reduced sensitivity or resistance of insulin target cells that transport glucose to attempt to provide blood glucose homeostasis. Chronic overeating results in the secretion of excess amounts of insulin to maintain blood glucose, which causes an overtaxing of the pancreas. There is a strong correlation between type II diabetes and obesity that contributes to a number of metabolic disorders, such as insulin resistance, metabolic syndrome, dyslipidemia, hypertension, blindness, cardiovascular disease and kidney failure (American Diabetes Association, 2013).

Several environmental risk factors for the development of type II diabetes have been identified in the evidence. Many individuals consume an excessive number of calories from fat and carbohydrates from processed foods and not enough fruits and vegetables. This overall

shift in nutrients has increased the rate of body fat storage, which leads to obesity. Another risk factor is the sedentary lifestyle or lack of exercise, which again leads to overweight or obese status that causes insulin resistance as well as increase risk for cardiovascular events (Kirsh, Watts, Pascuzzi, O'Day, Davidson, Strauss, & Aron, 2007).

According to the Centers for Disease Control and Prevention [CDC], (2012), diabetes affects 25.8 million people or 8.3% of the U.S. population. Among U.S. residents aged 65 and older, 10.9 million or 26.9% had diabetes in 2010. There were approximately 1.9 million individual over the age of 20 that were newly diagnosed with diabetes in 2010 in the U.S. The CDC estimates that 35% of the U.S. has been predicted to have pre-diabetes. Evidence has also found that diabetes is the leading cause of kidney failure, lower limb amputations and new cases of blindness among adults in the U.S. One of the most devastating complications of diabetes is the fact that diabetes is the 7th leading cause of death in the U. S. (Centers for Disease Control and Prevention, 2012).

Health care providers need to address the emotional and physical complications of type II diabetes as well as the significant health care costs. This is in respect to the complications that may develop because of type II diabetes and treatment expenses. Type II diabetes has a profound impact on the physical, mental and financial well-being of individuals as well as their families and communities (Parkins & Davidson, 2009).

The CDC estimated that in 2012, the total costs of diabetes care in the U.S. was approximately $245 billion. Direct medical costs for type II diabetes care was approximately $176 billion in which $69 billion was due to reduced productivity (American Diabetes Association, 2013). After adjusting for population age and sex differences, the average medical expenditures among people diagnosed with type II diabetes were 2.3 times higher than what expenditures would be in the absence of diabetes (American Diabetes Association, 2013).

The American Diabetes Association (ADA) has set up guidelines for the diagnosis of type I and type II diabetes that health care providers acknowledge. Diabetes is considered if an

individual has fasting blood glucose of greater than or equal to 126 mg/dl. Testing to confirm or eliminate the diagnosis of diabetes is an oral glucose tolerance test with a result greater than or equal to 200 mg/dl. This evaluates blood glucose levels initially fasting, with a follow up test two hours after one drinks a specific sweet drink. Any random plasma glucose test, greater than or equal to 200 mg/dl may be considered for diagnosis of diabetes. This particular testing evaluates a random blood test taken at any time of the day. The gold standard for diagnosis of diabetes is a hemoglobin A1C (HGB A1C) level of greater than or equal to 6.5% for both types of diabetes. The HGB A1C test measures an individual's average blood glucose for the past 90 days or 3 months (American Diabetes Association, 2013).

Statement of problem

Despite the rigorous endeavors to help the diabetic population with preventive health care, efforts have fallen short with standard therapies as standard office visits do not permit providers enough time to answer questions, formulate new treatment plans, or facilitate behavior changes (Ridge, 2012). The evidence indicates that there are greater than 470,000, or 9.8%, of adults in Indiana have diabetes, which is higher than the national average of 8.3%. In addition, 35% of adults in Indiana have been predicted to be pre-diabetic, which increases the risk of developing diabetes, heart disease and coronary artery disease. Health care costs associated with diabetes in Indiana are estimated currently at around $4 billion health care dollars annually (The Department of Health and Human Services, 2011).

Marshall County Indiana is the county of interest for this EBP project. The population is about 47,024 residents, including Plymouth Indiana which is the largest city. Marshall County has 12.0% of its population that live below the poverty level; Plymouth Indiana has 19.3% that live below the poverty level, which indeed is greater than the national average of 14.1% (The U.S Census Bureau, 2013). Of the 47,024 residents in Marshall County there are 9.4% that have documented diabetes which can be devastating to the individual, family, and community.

The population of Marshall County consists of 88.9% Caucasians, 8.8% Hispanics, and 2.3% African American, Asian and Indian. The educational status of Marshall County residents consists of 84% having from 8th grade to a high school diploma. It has been estimated that 10% of the residents have advanced degrees of a bachelor's degree or higher (U.S. Department of Health and Human Services, 2012).

Traditional one-on-one medical visits have not met the needs for the diabetic patients to improve outcomes and prevention of complications. This is related to progressive deterioration of knowledge, problem solving ability and quality of life. Evidence indicates health care providers today must address individual patient needs, beliefs, emotions and self-care behaviors with the type II diabetic population if self-care behaviors are to change (Ridge, 2012). The purpose of this EBP project was to examine the evidence to see how education has been utilized for diabetes prevention of progression of disease as well as disease stabilization.

The family practice in which the EBP project was completed houses four health care providers: one physician, two full time family nurse practitioners and one part-time emergency nurse practitioner. The family practice population is approximately 12,000 patients with approximately 25-30% having the diagnosis of diabetes. Understanding the demands and barriers that prevent primary care providers and patients from reaching diabetic treatment goals is crucial. The DNP student looked into the evidence and evaluated shared medical appointment as one way that improves outcomes by use of education, communication and patient participation in a group setting.

Shared medical appointments, also termed group visits, can be an innovative approach to diabetic care and outcomes. Shared medical appointments may be used in combination or in place of the usual one-on-one traditional care given by a health care provider. The SMA typically includes group education, shared problem solving, and focused private medical examination that allow some individual time with the health care provider. Appointments lasted from 90-120 minutes depending on the number of patients at each session. Patients had the

opportunity in the group environment to learn from each other, and provide encouragement and advice to other patients during the shared medical appointments that patients may not have received in a short traditional office visit.

Purpose of the EBP Project

The purpose of this EBP project was to replicate the shared medical model to examine the effects of HGB A1C levels. Patients' lifestyle and behavior plays a significant role in patients' physical as well as mental health. Interventions aimed at changing patients' unhealthy lifestyles are a priority for health care provider visits. Yet, changing lifestyle behaviors can be difficult and requires significant effort, time and motivation from both the health care provider and patient.

Replication of the model of shared medical appointments for diabetic patients in Marshall County provides a different way of delivering care, compared to traditional medical office visits. The DNP student analyzed outcomes, evaluated the findings, and recommend practice changes as a result of the findings. The compelling clinical question is: in adult type II diabetic patients, what is the effect of education with a shared medical appointment compared to traditional office visits on outcome measures of hemoglobin A1C levels over a 3 month period?

The EBP question in this project was developed by use of PICOT format. The components of the PICOT are as follows: (P) population of interest, (I) the issue or intervention of interest, (C) the comparison group, (O) the outcome to be measured, and (T) the time frame of the intervention (Fineout-Overholt & Stillwell, 2011). The EBP project of interest has been articulated with each essential component as follows: P - the population of interest for the EBP project is adult type II diabetic patients. Adult patients were able to participate, communicate and consent with the shared medical appointments. I – The intervention of interest was education during shared medical appointments. This included a brief individual assessment including assessment of height, weight, blood pressure, pulse and BMI measurements. Then the group was placed together when education on diabetes was provided, which included dietary intake, carbohydrate counting, nutrition, exercise and goal setting. C – The comparison

of interest included results of HGB A1C levels from the traditional office visit and shared medical appointments. Patients came to the first SMA with recent HGB A1C levels from the traditional office visit. The first SMA consisted of review of current results, education on lifestyle changes and nutrition, and then three months later repeat HGB A1C levels were obtained and compared to the baseline levels. O – The primary outcome of interest was HGB A1C levels. Several additional outcomes of interest were blood pressure changes, weight loss or BMI changes. T – There was a three month period from the initial SMA to the follow up SMA visit.

Significance of the project

Chronic disease such as type II diabetes, places a significant burden on the U.S. health care system. According to the American Diabetes Association (2013), the total health care costs for patients with diabetes were estimated at $245 billion in 2012, which is a 41% increase from the previous estimated cost of $174 billion in 2007. With the increase of incidence of diabetes and rising health care costs, health care professionals and health care organizations are facing demands from patients, as well as payers, in regards to quality, access, service and patient satisfaction. Shared medical appointments are a way to improve diabetic care and outcomes (American Diabetes Association, 2013).

CHAPTER 2

THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

Theoretical Framework

The theoretical framework for this EBP project was the Chronic Care Model (CCM). The CCM was developed by Ed Wagner in 2001, as a guide for the management of chronic illness (Coleman, Austin, Brach, & Wagner, 2009). The chronic care model "uses a systematic approach to restructuring medical care to create partnerships between health systems and communities" (Stellefson, Dipnarine, & Stopka, 2013, p. 1). The CCM has been designed to build on the interrelationships between six evidence-based pillars that lead to improved clinical quality and outcomes in regards to disease management. It has also improved care in health systems at the community level, health care organization level, primary care/practice level, as well as the patient level (Wagner, Austin, Davis, Hindmarsh, Schaefer, & Bonomi, 2012). The six pillars are as follows: (1) health care system/organization, which creates a culture to promote safe high quality of care; (2) delivery system design, which ensures efficient clinical care and self-management support; (3) decision support, which fosters clinical care with consistent scientific evidence and patient preferences; (4) clinical information systems that facilitate access to patient and population data, which cultivates improvement of efficiency and effective patient care; (5) community resources and policies, which activate various resources to meet patients' needs; and (6) self-management support, which is essential to empower patients with chronic disease to manage their health care needs (Zhang, Van Leuven, & Neidlinger, 2012).

Application of Chronic Care Model

The CCM has been used for diabetes care in United States primary care settings and positive patient outcomes, such as a decrease in HBG A1C levels, have been reported (Stellefson et al., 2013). The CCM has been applied to this EBP project for diabetes care and shared medical appointments in every pillar of the model. The six pillars of the CCM, as applied to SMA's in type II diabetes patients, will be discussed in the followng section.

Pillar 1. Health care system organization identifies the methods that have been used to improve quality and access to care. The advanced practice nurse (APN) has provided leadership and education on diabetes through shared medical appointments which has built confidence in the patients understanding of the disease process. A priority for the APN was to intervene with patients at risk for developing complications by providing education to improve clinical as well as behavioral outcomes. According to Stellefson et al. (2013), a systematic review indicated that health care systems in support of the CCM approach found positive benefits associated with HGB A1C reductions of at least 1% during a 12 month period, as well as improved foot care. This review found positive changes associated with improved blood pressure, cholesterol levels, weight reduction and body mass index (BMI).

Pillar 2. Delivery system design was intended to facilitate skill-based learning for the diabetic patient, by use of education on nutrition, lifestyle changes and patient empowerment. This step involved coordination of care, which includes recommendations for foot care, eye care, nutritional counseling and follow up recommendations. During this pillar each patient was encouraged to take control of his/her diabetes and learn self-management skills. The American Diabetic Association (2013) recommends health care delivery which provides optimal care of diabetes by prevention and management of complications. This has been accomplished by addressing barriers to care such as lack of knowledge and awareness of services available for diabetes (Stellefson et al., 2013).

Pillar 3. Decision support provides guidance for implementing evidence-based care. This pillar included: (1) education on risk factors, (2) regular follow-up with primary care providers, and (3) information about risk factors and identifying barriers (Stellefson et al., 2013). According to Stellefson et al. (2013), “training PCPs on evidence-based guidelines and methods for implementing CCM resulted in improved PCP adherence to clinical guidelines, including the American Diabetes Association (ADA) Standards of Care and Institute for Clinical Systems Improvement (ICSI) Clinical Guidelines for Hypertension, Diabetes, and Hyperlipidemia” (p. 4).

The project cordinator assisted in the integration of evidence-based guidelines into clinical practice.

Pillar 4. Clinical information systems consists of tracking progress through reporting outcomes to patients and providers. This pillar was accomplished by reviewing hemoglobin A1C levels prior to the start of each shared medical appointment and at the follow-up visit three months later for comparison. The family practice setting, where the SMA were held, has electronic medical records (EMR) that provided the access to retreive stored data on laboratory results, previous visits, medications, health insurance, as well as co-morbid conditions. According to Stellefson et al. (2013), clinical information systems using disease registries and EMR help “patients and providers set self-management goals and review progress reports to determine whether patients met their predetermined goals” (p. 5).

Pillar 5. Community resources and policy include a variety of services and resources that are available within an organization. Increasing access to effective services in the community with relevant agencies are cost-effective ways to obtain important services such as nutritional counseling or peer support groups (Stellefson et al., 2013). Education during this EBP project was provided to patients about community-based resources available such as eye care, foot care, and patient assistance programs that are essential for the diabetic patient.

Pillar 6. Self-management support is the last pillar in the CCM. The evidence has shifted the focus from didactic patient education to encouragement and support through effective self-management. Evidence indicates that individual and group interventions that emphasize patient empowerment and the acquisition of self-management skills are effective in diabetes care (Wagner et al., 2012). Education during a SMA’s addressed a variety of topics, such as medication compliance, foot care, interpretation of laboratory results and goal setting. Review of literature found that diabetes self-management education generally improved psychosocial and clinical outcomes in patients with diabetes and disease progression (Stellefson et al., 2013).

Strengths and Limitations of the Chronic Care Model and Shared Medical Appointments

The CCM is an evidence-based guideline and a synthesis of system changes to guide quality improvement (Wagner et al., 2012). Patients that participate in a shared medical appointment guided by the CCM for disease management are more likely to receive patient-centered, patient-structured, and quality collaborative care (Szecsenyi, Rosemann, Joos, Peters-Klimm, & Miksch, 2008). Strengths of the CCM and SMAs include several major elements: (1) effective delivery of care; (2) facilitation of self-management of care; (3) evidence-based tools and techniques of providing care, while controlling costs and allocating resources; and (4) system for improving the quality of care for individual patients and populations (Kirsh & Aron, 2008). Limitations may be that the CCM has only been utilized in health care since 2001, compared to other theoretical models that have been utilized and tested for decades. A limitation may be considered that patients may not feel confident to speak freely and honestly in regards to personal health and lifestyle practices.

According to Coleman et al. (2009), evidence suggests that “some type of external incentive and quality improvement support may be essential for widespread practice change” (p. 80). In the next decade, the impact of chronic illness on health care and health care cost will drive the health care system to explore strategies such as the use of SMAs and CCM to improve patient satisfaction and improve patient outcome scores. The CCM has provided guidance in regards to chronic illness such as diabetes, as well as, a systematic approach to improve care (Wagner et al., 2012).

Evidence-Based Framework

There are several evidence-based models that are available for EBP. The Stetler Model of evidence-based practice offered the best fit for this EBP project. There is increasing recognition that advance practice nurses utilize models in an effort to change clinical practice and should be guided by conceptual frameworks and models (Melnyk & Fineout-Overholt, 2011). The Stetler

Model has long been known “as a practitioner-oriented model because of its focus on critical thinking and use of findings by the individual practitioner” (Melnyk & Fineout-Overholt, 2011, p. 246).

Utilization of the Stetler Model includes a series of five phases which are: (a) preparation, (b) validation, (c) comparative evaluation/decision-making, (d) translation/application, and (e) evaluation. Each phase was created to facilitate critical thinking about the practical application of research findings. In phase one of this model, preparation represents defining and affirming a priority need. This includes reviewing and organizing the work, and systematically initiating a search for relevant evidence (Melnyk & Fineout-Overholt, 2011). In the preparation phase, diabetes was defined as a priority need. In addition, relevant evidence was searched in regards to shared medical appointments, diabetes care, and HGB A1C levels.

In phase two, validation assesses the body of evidence by systematically critiquing each study or document obtained. The primary task of this phase was to evaluate all the evidence for credibility and applicability that relates to the identified need (Melnyk & Fineout-Overholt, 2011). The quality of diabetic care in the United States is sub-optimal, with less than 10% of the population of patients being treated to recommended therapeutic targets (Lavoie, Wong, Chongo, Browne, MacLeod, & Ulrich, 2013). The evidence validated the increase of patients developing diabetes and the need for education for the prevention and treatment of disease to improve patient outcomes.

In phase three, comparative evaluation involved decision-making after synthesizing the body of evidence. This phase logically organized the evidence for similarities and differences (Melnyk & Fineout-Overholt, 2011). The evidence was evaluated for feasibility and pragmatic fit for diabetes education and shared medical appointments. Comparative evaluation and decision-making was compared and evaluated for existing evidence in regards to diabetes. Evidence indicated education during shared medical appointments is an avenue to achieve improved patient outcomes.

The fourth phase of translation and application converts findings into a type of change to be made or putting a plan into action. There are several steps in this phase as follows: (1) identification of the type of research; (2) identification of the method (informal/formal, direct/indirect); (3) identification of the level of research (individual, group, organization); (4) assessment of whether translation and use goes beyond actual evidence; (5) then consideration of the need for appropriate, reasoned variation of the evidence; and (6) plan a formal dissemination and change strategy (Melnyk & Fineout-Overholt, 2011). During this phase the challenge was to translate and apply the research into the practice setting. During shared medical appointments the research obtained provided a foundation to aid in the education component to help diabetic patients understand the disease process and empower patients in meeting self-care needs.

Evaluation was the fifth phase of the Stetler Model identified. This phase evaluates the plan in terms of the "degree to which it was implemented and whether the goals for using the evidence were met" (Melnyk & Fineout-Overholt, 2011, p. 247). The project coordinator assessed and evaluated what was needed to implement change, in order to assess the cost-benefits of the patient, program and practice. The objective of this EBP project regarding diabetes care and shared medical appointments was to evaluate if education resulted in changes in HGB A1C levels.

Evidence through literature review indicates that the Stetler Model "is a sequential but interactive series of critical thinking and criteria-based decision-making steps, ultimately, the Stetler model's steps have been designed to facilitate effective use of research and other best available evidence" (Stetler, 2010, p. 76). The Stetler Model was utilized to guide the implementation of this doctoral student's EBP project. The five phases of preparation, validation, decision-making, translation and evaluation of evidence into practice was applied in the review of the literature.

Literature Search

A literature search was conducted to identify sources of evidence including evidence summaries, clinical guidelines, integrative and systematic reviews, meta-analysis, randomized control trials (RCT), and primary research studies. The aim of this literature review was to critically appraise the evidence of education during shared medical appointments with type II diabetic patient's ages 18-75. The objective was to evaluate HGB A1C levels over a three month period in response to the education intervention provided. The review focused on shared medical appointments and the effect of education. The following PICOT question was answered: in adult type II diabetic patients, what is the effect of education with a shared medical appointment on outcome measures of hemoglobin A1C levels over a three month period?

Search Engines

The electronic searched databases for this review include: (1) Cumulative Index to Nursing and Allied Health Literature (CINAHL), (2) Joanna Briggs Institute Clinical Online Network of Evidence for Care and Therapeutics (JBI ConNect), (3) MEDLINE, (4) Cochrane Collaboration and Library, and (5) ProQuest. The search terms used included: type II diabetes, education, shared medical appointments and chronic care model. In the initial search, a total of 105 scholarly articles were obtained and reviewed, and then inclusion criteria were applied.

Identify Sources Examined for Relevant Evidence

Besides scholarly articles that were obtained from the above search engines, additional hand search efforts were conducted from multiple journals such as: *The Journal for Nurse Practitioners* (JNP), *Clinical Diabetes* and *Diabetes Care*, both produced by the American Diabetes Association, and *The Journal of the American Medical Association* (JAMA). Diabetic education with use of the CCM have been found in the literature and the barriers that primary care providers face in the practice settings (Zhang et al., 2012).

Inclusion and Exclusion Criteria

The inclusion criteria requirements were as follows: (a) primary research, (b) peer review, (c) type II diabetic patients, ages 18-75, (d) published in English, and (e) published within the past 10 years. Excluded studies were as follows: (a) focus on type I diabetes, (b) non-research articles, (c) were not in English, and (d) published before 2003. After application of the inclusion and exclusion criteria, 14 articles met the inclusion criteria for this literature review.

Expert Opinions

Clinical practice standards are created from research data, evidence-based practice and use of expert knowledge to guide decisions on health care. To gain a thorough understanding of the highest quality of evidence-based standards for diabetic care, the ADA's Standards of Medical Care in Diabetes (2013) was obtained. The ADA's clinical practice guidelines utilizes an evidence grading system for clinical practice recommendatins that are defined within the guideline (American Diabetes Association, 2013).

Levels of Evidence

The literature was appraised for quality and level of evidence using the "Rating System for the Hierarchy of Evidence" published in Melnyk and Fineout-Overholt (2011). This rating system includes seven levels ranging from Level I which are strongest, to Level VII which are weakest. The level of evidence according to this rating system is as follows: (a) Level I is evidence from a systematic review or meta-analysis of all relevant RCTs, (b) Level II includes evidence from well-designed RCTs, (c) Level III is evidence from well-designed controlled trials without randomization, (d) Level IV includes evidence from well-designed case-control and cohort studies, (e) Level V rates evidence from systematic reviews of descriptive and qualitative studies, (f) Level VI includes evidence that is obtained from a single descriptive or qualitative study, and (g) Level VII is the lowest rated evidence that comes from opinions of authorities and expert committees (Melnyk & Fineout-Overholt, 2011).

The evidence obtained from the literature was appraised using the "*Appraisal of Guidelines for Research and Evaluation*" (AGREE II) instrument (Melnyk & Fineout-Overholt, 2011). One limitation with this appraisal tool was that only one reviewer looked at the studies. This tool was used to assess the quality of guidelines, provided a methodological strategy for the development of guidelines and provided guidance on how the information should be reported. The AGREE II instrument consists of six domains that capture a specific aspect of guideline quality. The Domains are as follows: (1) scope and purpose; (2) stakeholder involvement; (3) rigour of development, which was the process of gathering and summarizing the evidence; (4) clarity of presentation, which includes language, structure and format of the guidelines; (5) applicability, which consists of potential barriers and resources needed to implement the guidelines; and (6) editorial independence (Brouwers, Kho, Browman, Burgers, Cluzeau, Feder, & Zitzelsberger, 2013).

Appraise Relevant Evidence

One of the key steps of evidence-based practice was to critically appraise evidence to best answer a clinical question. Critical appraisal of quantitative research was necessary for evidence-based practice. This literature review has critically appraised the evidence and there are 14 scholarly articles that met criteria and were included. A total of four level I systematic, or integrative reviews were appraised first. There are three level II randomized control trials and two level III quasi-experimental with concurrent, but non-randomized control studies included. Next, there were two level V systematic reviews of qualitative studies and one level VI single qualitative study. Finally, there were two level VII studies that include peer reviews of qualitative studies as well as peer author opinions that complete the literature review (Table 2.1).

Simmons and Kapustin's (2011) integrative review of shared medical appointments, examined 18 articles to find that nine studies met criteria. Findings indicated that the diabetes group visit concept is a viable alternative to standard primary care. Less than 10% of patients with diabetes meet therapeutic goals, and the recommendation of this review indicated that

health care provider's needs to seek new approaches, such as shared medical appointments, for patients with chronic disease such as diabetes. Alternative methods of care for patients with chronic disease such as diabetes are needed because traditional outpatient care does not seem to be sufficient.

A systematic review of the standards of medical care for diabetes was established and published by the American Diabetes Association in 2013. This review searched human studies related to diabetes care since January 2011. There were three objectives that developed from this review, which are as follows: (1) optimize provider and team behavior by developing strategies to help providers and patients set goals for improved health, (2) support patient behavior change and address emotional concerns, and (3) change the system of care, such as the Patient-Centered Medical Home (PCMH), which showed improved outcomes through coordinated primary care by offering new opportunities for team-based chronic disease care. The conclusion was clear that "optimal diabetes management requires an organized, systematic approach and involvement of a coordinated team of dedicated health care professionals working in an environment where patient-centered high quality care is a priority" (American Diabetes Association, 2013, p. S50).

A systematic review by Zhang, Van Leuven, & Neidlinger (2012) looked at over 100 articles where 31 met criteria. A review of the literature identifies system barriers that prevent primary care providers from efficiently and effectively managing their patients with diabetes. Practice implications must include quality of preventive care measures, chronic disease management and holistic treatment of patients in order to reach optimal diabetes management (Zhang et al., 2012).

Housden, Wong, and Dawes (2013) performed a systematic review identifying 94 studies. Twenty-six of these studies met criteria, in which 13 were RCTs. The conclusion indicated group medical visits for diabetic patients were found to be effective in terms of

reducing HGB A1C levels. The results suggest that wider implementation of group medical visits for patients with diabetes will have a positive effect on patient outcomes (Housden et al., 2013).

A total of three randomized controlled trials are included in this review. Each article indicates that there is no single definition of shared medical appointments that are universally accepted. First, Weinger (2003) evaluated education-based cluster visits in chronic care clinics with individual physician visits and group medical visits. Education-based cluster visits are monthly two-hour visits with a multidisciplinary team led by a nurse educator and included a pharmacist, dietitian and behavioral therapist. Results of cluster visits showed an improvement in HGB A1C results by 0.2 percentage points. In addition, findings indicated improved satisfaction with diabetes care and increased frequency of self-monitoring blood sugars. Chronic care clinic visits with primary care providers did not differ from the control subjects in health status or HGB A1C levels. Group medical visit (GMV) trials found HGB A1C results were the same for the two groups at baseline, yet after two years, patients in group visits maintained their baseline levels and those in control groups had worsening levels. GMV had greater satisfaction with improved patient knowledge and quality of life leading to fewer repeated hospitalizations. In conclusion, each model recognizes that patient education is extremely important, yet there is an obvious need for more systematic investigation into group medical appointments (Weinger, 2003).

Cade, Kirk, Nelson, Hollins, Deakin, Greenwood, & Harvey (2009) assessed whether the expert patient program (EPP) that focused on patient education with type II diabetes promoted healthy eating to improve glycemic control. The EPP is another term utilized for shared medical appointments. There were 317 adult diabetic patients that were randomized to receive either EPP education or individual one-on-one appointments with a dietician (control group). The aim of this study was to train people with diabetes to deliver the EPP to other people with diabetes. The study failed to show any significant changes in outcomes between the intervention and control group after 12 months. One factor that could have contributed to the lack of difference in

glycemic control between the groups was the high percentage of dropouts during the study (Cade et al., 2009).

Deakin, Cade, Williamst and Greenwood (2006) evaluated a patient-centered, group-based self-management program (X-PERT) based on theories of empowerment for adult type II diabetic patients. There were 149 participants attending four or more sessions over a 14 month period that focused on skill development and confidence building to enable patients to make informed decisions regarding their diabetes self-care. Statistically significant improvements were shown in the X-PERT patients compared to the control patients with improved HBG A1C levels. Additional findings include the following: (a) decreased total cholesterol levels, (b) decreased body mass index (BMI), (c) improvement in self-empowerment, (d) increased diabetes knowledge, (e) increased physical activity, and (f) higher treatment satisfaction. The improved knowledge of type II diabetes coincided with improved problem-solving ability in the group-managed subjects and decreased problem-solving ability in the control group (Deakin et al., 2006).

In 2009 a large urban, academic family practice launched a quasi-experimental matched controlled pre- and post-study design. Patients in the group visit and the comparison group were matched on gender, age, race, and zip code, in an effort to control the possible influence these variables may have on outcomes. Findings indicated that HGB A1C declined by 76.9% compared to 54.3% in the comparison group. Statistical significance in A1C levels was noted in the group appointments. Early experience with the group visit program was encouraging and suggested it may improve management of diabetes and recommendations were for further research (Reitz, Sarfaty, Diamond, & Salzman, 2012).

A second quasi-experimental with concurrent, non-randomized control study was completed in a primary care clinic at a tertiary care academic medical center. The purpose of this study was to improve outcome measures on HGB A1C levels for diabetic patients at highest cardiovascular risk. Several outcomes were statistically significant including: (a) reduction in

HGB A1C, (b) decrease in low density lipoprotein (LDL), and (c) decrease in systolic blood pressure (SBP). Conclusions indicated that SMAs for diabetes constitute reorganization for health care providers to help improve quality of care and quality of life for the diabetic population. In addition, it was recommended that this model be applied to other chronic conditions such as hypertension and congestive heart failure (Kirsh, Watts, Pascuzzi, O'Day, Davidson, Strauss, & Aron, 2007).

A total of two, Level V articles are included in this review. Watts, Gee, O'Day, Schaub, Lawrence, Aron, & Kirsh (2009) evaluated the roles of the nurse practitioner's (NP) in caring for patients with chronic disease in shared medical appointments based on the chronic care model. Qualitative case analyses of three case studies were reviewed in regards to diabetes and SMAs in which NP's played leadership roles. Implications for practice indicated that with the increase in chronic illness and healthcare challenges there is a significant need for patients to participate in their own care and NP's play a role in assisting with self-empowerment through shared medical appointments (Watts et al., 2009).

Dancer and Courtney (2010) reviewed research findings that improve outcomes for type II diabetes patients utilizing the chronic care model. The outcome of the article indicated that disease management must shift from an incomplete and scattered focus of episodic care to a comprehensive model, such as the chronic care model to improve outcomes of chronic disease. Implications for practice based on these articles indicated that the NP needs to assume a multifaceted leadership role in improving chronic care needs and outcomes.

There is one Level VI that was included in this literature review. Kirsh, Schaub and Aron (2009) studied the integration of inter-professional education and shared medical appointments for diabetes. Inter-professional differs from multidisciplinary in that health care providers are on equal planes. Inter-professional synergistically promotes high-quality care involving pharmacy, psychology, nutrition and social work to provide holistic care. Findings suggested that SMAs

promote improved understanding of chronic disease, along with an increased confidence in the ability to care for the patient with chronic disease such as diabetes (Kirsh et al., 2009).

Finally there are two Level VII articles that have been evaluated for this literature review. Lavoie et al., (2013) implemented a peer review, seeking to find if group medical visits offer a novel format for the delivery of patient-centered primary health care services, especially for patients with chronic disease. For the purpose of this review, 34 providers and 29 patients participated who have been engaged in previous group medical visits. There was an improvement in the key format and process-oriented elements identified in group medical visits. The results signify a shift in the role of the provider with increased trust, increased knowledge for the provider and the patients and improved patient self-management. The results also indicate increased satisfaction for patients and providers. Finally, this review found a continuity of patient relationships and knowledge in the presence of combined support and care during a group medical appointment that can improve patients' service use and health behaviors (Lavoie, et al., 2013).

Davis, Sawyer and Vinci (2008) evaluated the relationship of group medical visits and education in diabetes care. Data over a three year period indicated that patients who have participated in group medical appointments and set goals have lower A1C levels compared to traditional office visit appointments. Patient survey data suggests that patients felt well cared for, better supported and more successful and confident in self-management of their diabetes (Davis et al., 2008).

Shared medical appointments are an alternative method of care in the growing demand for high-quality health care services in an environment of declining reimbursements. In clinical trials, shared medical appointments have demonstrated to be effective in improving patient compliance, patient knowledge, improved problem-solving skills and quality of life compared to traditional provider care. Gaps in knowledge can be attributed to there being no universal model for shared medical appointments. During this literature review, no clinical trials have reported

the same standardized curriculum between a control group and an intervention group. In addition, no trials were found that evaluated shared or group medical appointments verses individual office visits that occur on the same treatment schedule as the shared medical appointments (Ridge, 2012).

Construct EBP

The critically appraised literature review provided a foundation for practice recommendations for this EBP project. A complete synthesis of the literature provided the DNP student with an organization of the evidence, so that one might recognize the core components of best practice for shared medical appointments utilizing the chronic care model. Therefore, implementation of the best practice recommendations, as in this EBP project, has answered the clinical question.

Synthesize Critically Appraised Literature to Support EBP Recommendations

The literature review supported the use of multidimensional provider interventions that have resulted in improved care for adult type II diabetic patients through use of shared medical appointments. Ultimately, the goal when managing the population of diabetic patients was to prevent acute and chronic complications such as, cardiovascular disease, hypertension, dyslipidemia, retinopathy, neuropathy, nephropathy disorders as well as circulatory and vascular issues that result in amputations.

Several studies recommended additional research in regards to shared medical appointments; yet the evidence identified the following benefits in regards to diabetes care: (1) improved diabetes outcomes; (2) improved diabetes knowledge; (3) skills developed for problem-solving and self-efficacy; (4) improvement in overall blood sugar and hemoglobin A1C levels; (5) improved patient satisfaction scores; (6) secondary benefits such as weight loss, improved lipid panels, improved hypertension; and (7) self-empowerment.

In summary, shared medical appointments include key components including group education, shared problem-solving, focused private or semi-private medical examinations, and

recommendations for medication adjustments along with referrals as needed. In addition, as these sessions last 90-120 minutes, these visits provide better access and improved counseling, between-patient learning and self-efficacy (Davis, Sawyer, & Vinci, 2008). Outcome measures, including the evaluation of diabetes care standards, improvement in associated healthcare costs, improved hemoglobin A1C improvements and improved patient satisfaction scores, are all benefits from shared medical appointments (Simmons & Kapustin, 2011). Results are promising enough to consider expansion of the use of shared medical appointments to other chronic conditions such as chronic obstructive pulmonary disease (COPD), congestive heart failure and hypertension (Watts, O'Day, & Pascuzzi-Frangella, 2012). Lastly, the concensus with shared medical appointments focused on prevention, elimination of barriers to care, and self-management, which are integral strengths to help sustain optimal target outcomes in care (Watts, et al., 2009).

There have been multiple interventions studied, and the majority of the studies reviewed have positive outcomes in regards to SMAs. The evidence supports implementing SMAs in the primary care setting to deliver diabetes care and to meet the standards of medical care needed for diabetes. Shared medical appointments allow for greater efficiency in providing care in a group setting, decrease the repetition of information and promote positive interactions between providers and patients while improving outcomes. SMAs also offer support to patients who need to make major lifestyle changes and provide structure to manage very complex health care that may be poorly managed (Ridge, 2012). The reimbursement for SMAs and the relative cost will vary depending on the number of patients per group setting, yet the educational benefits, such as patient empowerment and satisfaction, are assets to shared medical appointments.

Positive benefits found in the literature on the chronic care model include: (a) improved care for diabetic patients, (b) positive outcomes, (c) self-efficacy for disease management, and (d) positive behavioral changes. Even when modest levels of the CCM implementation are utilized in unsupported primary care practices, they are associated with improved care for the

diabetic patients with higher rates of behavioral changes (Strickland et al., 2010). The CCM was a valuable model of care that defined the essential elements of chronic disease care that was well suited to the management of type II diabetes (Dancer & Courtney, 2010). The Center of Disease Control and Preventions (2013) systematic review indicated that the CCM was being used for diabetes care in the U.S. primary care settings and positive outcomes have been reported and documented. In addition, research of integration of the CCM into primary care settings for diabetes management provided guidance for clinical decision and self-efficacy for disease management (Stellefson et al., 2013).

Describe The Best Practice Model Recommendations

After critical analysis of included literature, there was strong evidence to support the use of education during shared medical appointments with diabetic patients. This way of providing medical care and education enhanced patients understanding of the essential components that are required to improve outcomes, as well as, prevent complications of diabetes. The use of evidence-based practice provided a framework for this EBP project and diabetes education. Ultimately, improved health was the goal of this EBP project as evident by a decrease in HGB A1C levels. Shared medical appointments and the chronic care model compliment what was been found in the evidence. This literature review serves as the basis for development of provider interventions that enhanced the overall quality of care provided to patients with type II diabetes.

Best Practice Recommendations To Answer The Clinical Question

The results of this literature review supported the use of shared medical appointments to focus on educational interventions that lead to behavioral changes, improvement of diabetes care and HGB A1C outcomes. Shared medical appointments, according to the evidence, benefit diabetes care by providing patients with the skills to improve knowledge, self-efficacy and self-management of their health. Health care providers have the opportunity to utilize the shared medical appointment model to coordinate care for groups of patients with diabetes and other

chronic care diseases. The best practice recommendations help to answer the clinical question. The PICOT question is, “in type II adult diabetic patients, what is the effect of education during a shared medical appointment visit, compared to traditional office visits on hemoglobin A1C levels over a 3 month period?” Utilizing education during a shared medical appointment which was supported in the literature allows the project coordinator to discover the answer to this question through the implementation of this EBP project. Using evidence-based intervention measurements, the project coordinator was able to assess changes in hemoglobin A1C levels which improved health, decreased risk factors and improved patient satisfaction that replicate what was found in the literature.

Table 2.1 Levels of Evidence from the Appraisal of Literature

Author(s) Year	Level of evidence	Key evidence related to the EBP project
Simmons and Kapustin (2011)	Level I Systematic Review	Total of 18 articles were reviewed and 9 studies met criteria. Findings indicated that diabetes group visit concept is a viable alternative to standard primary care.
American Diabetes Association (2012)	Level I Systematic Review	Standards of Medical Care in Diabetes Systematically searched Medline for human studies related to each subsection from current date back to previous revision of 2011.
Zhang et al (2012)	Level I Systematic Review	Over 100 articles were identified and 31 met criteria. A review of the literature identifies system barriers that prevent PCPs from efficiently and effectively managing their patients with diabetes. Practice implications of the current care model are not structured for chronic disease and barriers need to be addressed.
Housden et al (2013)	Level I Systematic Review	94 studies identified, 26 of them met criteria, in which 13 were RCTs. Conclusion indicated group medical visits for diabetic patients were found to be effective in terms of reducing HGB A1C levels.
Weinger (2003)	Level II Randomized Control Trial	In brief, group medical appointments demonstrated improved glycemic outcomes during randomized trails. But it was noted that the term “group medical visits” currently have no single definition that is universally accepted.
Cade et al (2009)	Level II Randomized Control Trial	In this study of type II diabetes patients, they were randomized into two groups. Patients either received diabetic specific education (*n*=317) or standard individual appointments (*n*=155). There were no significant differences between the control and the intervention group in any of the clinical outcomes measured. There were limitations due to some loss of participants between baseline measurements and randomization.

Deakin et al (2006)	Level II Randomized Control Trials	149 participants attending 4 or more sessions and findings indicated improved glycemic control as well as decreased total cholesterol levels and BMI. Additional findings indicated patients developed self-empowerment and treatment satisfaction.
Reitz et al (2012)	Level III Quasi-experimental with concurrent, but non-randomized control	A quasi-experimental matched controlled pre- and post-study design was used to reduce the risk of bias. Patients were separated into a group appointment and a comparison group. Findings indicated that HGB A1C declined by 76.9% compared to 54.3% in the comparison group. Early experience with the group visit program was encouraging and suggested it may improve management of diabetes and recommendations were for further research.
Kirsh et al (2007)	Level III Quasi-experimental with concurrent, but non-randomized control	This study had 112 patients that met criteria with only 44 patients (39%) agreeing to participate. One limitation was the dropout rate with only 9.1% participating in four visits. Results still indicated a reduction in HGB A1C in the intervention group relative to the control group. In-addition there was benefits in terms of cardiovascular risk reduction.
Watts et al (2009)	Level V Qualitative case studies	Case studies of 3 diabetes disease-specific SMAs in which NP's played leadership roles. Implications for practice indicated that with the increase in chronic illness and healthcare challenges there is a significant need for patients to participate in their own care and NP's play a role in assisting with self-empowerment.
Dancer and Courtney (2010)	Level V Systematic Review of qualitative research studies and research reviews	Research Reviews of multiple computerized databases in regards to diabetes outcomes and CCM. Evidence shows collaborative care with NP involvement improves both physiological outcomes and patient-centered aspects of care.

Kirsh et al (2009)	Level VI Qualitative Study	This study had a SMA intervention group (*n*=12) and comparison group (*n*=12). Findings indicated significant change toward behaviors and attitudes in the intervention group. Further research was recommended to determine the efficacy of SMAs as an inter-professional training venue is needed that focuses on comprehensive assessment and identification of barriers.
Lavoie et al (2013)	Level VII Peer Review of Qualitative Studies	Interviews from 34 providers and 29 patients who were engaged in group medical visits (GMV). This study has shown that GMV offers an alternative for diabetes care that reflects the ideal patient-centered care. This study consensus identified that patients form a relationship of care with their providers, relationships that are voluntary, that respect and enable autonomy, accountability, fidelity and humanity.
Davis et al (2008)	Level VII Peer and author opinions	Data over a 3-year period showed that patients who participate in planned or group medical visits and set goals have had lower HGB A1C levels than the average clinic visit. This article reviewed literature and explores practical issues from various authors' experience in a Midwest academic medical center.

CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

The purpose of this EBP project was to evaluate the benefits of education during shared medical appointments (SMA) with type II diabetics on HGB A1C levels. The intervention was to evaluate individuals between the ages of 18-75 who have a diagnosis of type II diabetes. This EBP project evaluated if education had an effect on HGB A1C levels between the first educational SMA and the follow up SMA three months later. The project intervention took place over the course of about four months, between September 1st, 2013 and December, 31st 2013. Using the Chronic Care Model (CCM), this evidence-based project utilized a systematic approach restructuring medical care to create partnerships between health care providers and patients (Stellefson, Dipnarine, & Stopka, 2013). This chapter selected elements of the CCM that are used in the routine care of patients with diabetes. The primary focus was on patient education to assess changes in the delivery of primary care that had benefits with reductions on hemoglobin A1C levels.

Setting and Sampling

The project was conducted at a small rural primary care family practice clinic in the Midwest, in Marshall County Indiana. The practice currently has one physician, one part-time emergency nurse practitioner as well as two full time family nurse practitioners, in which the project coordinator is a certified diabetes educator (CDE). The clinic focuses on family practice which cares for patients of all ages from birth to the elderly. A variety of services are provided at this primary care practice including: (a) routine medical care, (b)industrial medicine, (c)cardiac rehabilitation, (d) radiology services, (e) outpatient laboratory services as well as wellness care. Hours of service are from 7:00 am until 5:00 pm Monday through Thursday and 7:00 am until 1:00 pm on Fridays. This project has been created in response to the providers' concern and desire to improve patient care, patient outcomes and reduction of HGB A1C levels in type II diabetic patients in the clinic.

The population of interest was adults between the ages of 18-75 who have a diagnosis of type II diabetes. Evidence indicates that individuals with type II diabetes have an increased risk of developing complications such as coronary heart disease, nephropathy, neuropathy and retinopathy. Excluded from this EBP project are type II diabetic patients that have been diagnosed within the past year, patients with type I diabetes, and patients that were unable to read or write in the English language. All the providers from the family practice of interest were given an in-service on this EBP project, patient selection including inclusion and exclusion criteria, and guidelines for patient referrals. The project coordinator reviewed all the charts to ensure that each patient met the criteria for inclusion.

Outcomes

The primary outcome of interest at the completion of this intervention was HGB A1C levels. The objective was to evaluate if use of education during a SMA had any impact on this outcome. Secondary outcomes, such as blood pressure, weight and BMI was reviewed to determine if education during the SMA had an influence on lifestyle changes and overall health.

Collection of Baseline Data

The primary clinic providers care for patients with the diagnosis of type II diabetes on a daily basis. Hemoglobin A1C levels are collected every three months as a standard of practice. Laboratory testing was obtained approximately one week prior to each shared medical appointment and was available for review during the visits. Laboratory testing obtained such as comprehensive metabolic panels (CMP), lipid profiles, complete blood counts (CBC), thyroid stimulating hormone (TSH) levels, vitamin D3 levels and C-peptide levels may be of value in the care of diabetic patients but was not considered as secondary outcomes in this EBP project. All of these tests are ordered by the discretion of each provider. Patients with type II diabetes typically have normal to high levels of C-peptide, reflecting higher amounts of insulin but relative insensitivity or resistance to the body needs (Patel & Macerollo, 2010). C-peptides may provide a guideline for each provider in regards to treatment options and if insulin is required. In

addition, C-peptides are recognized by the ADA as an appropriate measurement tool for evaluation and treatment in type II diabetes care (American Diabetes Association, 2013).

Prior to any participation in the shared medical appointments, handouts were provided for each patient that explained the purpose of this EBP project (see Appendix B) and the project benefits (see Appendix C). Data collection included each patients actual height, weight, BMI, blood pressure, foot exam, as well as most recent laboratory results, specifically HGB A1C level.

The initial shared medical appointment took place after chart review had been completed by the project coordinator. Upon arrival to the shared medical appointment each patient was provided a packet that consisted of various handouts including informed consent (see Appendix D) and confidentiality statement (see Appendix E). Each patient was required to sign each of these forms as well as fill out a health questionaire (see Appendix F) prior to the participation in the shared medical appointment. Patients were brought back one at a time by a medical assistant, and blood pressure, weight and BMI were obtained. Next, the patient went individually in an exam room. Then the project coordinator completed an examination, including a foot exam and auscutation of heart and lung sounds, prior to taking each patient into the community room where the shared medical appointment and education session took place.

At the beginning of each shared medical appointment the project coordinator explained the objectives of the intervention, the duration of time expected, the expectations of each patient and the potential benefits. Each patient received a packet of educational information, including carbohydrate counting, label reading, goal setting for each individual, as well as the American Diabetes Association recommendations on servings size and measurement tools. The project coordinator presented a short power point (see Appendix H) on types of diabetes, risk factors as well as complications and basic recommendations to physical activity. After the Power Point presentation, the project coordinator spoke with each individual patient about his/her current laboratory results, medication list, and results of HGB A1C levels.

The dietician and the medical assistant had been trained by the project coordinator about the handouts that follow ADA guidelines which were provided to each patient. The time frame that was alotted for education on handouts was approximately thirty minutes which included carbohydrate counting, label reading and nutrition, that the project cordinator and dietician provided. At the closure of the first shared medical appointment, patients were given individual meal plans, goals for carbohydrate servings per day, and the opportunity to ask any questions that have developed.

Measures, Management and Analysis

Patient selection was by provider referral and was not randomized. All data was managed within a table format to keep patient information confidential. Each patient was assigned a number, rather than name, initial or chart number. The master list of participants and their files were kept in a locked file cabinet within the project coordinators office to protect each individual's privacy. At the completion of the data collection from the initial and follow up shared medical appointment, analysis and interpretation of the data was completed. Descriptive statistics and a paired t-test were utilized as hemoglobin A1C followed the normal distribution. Data analysis was completed by the project coordinator with use of SPSS software.

Implementation of Practice Change

The best approach to diabetes care is prevention, but with the overwhelming numbers of diabetic patients in the United States, health care providers need to find new and innovative ways to address the burdens of diabetes complications and outcomes. Diabetes research was the key for health care providers to progress in treatment strategies and ultimately prevention of complications that accompany diabetes. Education through shared medical appointments is one way to bridge the gap in regards to diabetic care that optimizes provider and team behavior, support patient behavior change and change the system of care (American Diabetes Association, 2013).

Protection of Human Subjects

Participation in this EBP project was kept confidential at all times. All identifying information, such as laboratory results, was kept locked at all times. Destruction of patient information was done by the project coordination at the end of this EBP project. All information that will be reported in presentations, as well as future publications, will be reported as an aggregate and no identifying names or characteristics will be used. This project has been approved by the Institutional Review Board (IRB) at Valparaiso University as well as IRB at Indiana University Health La Porte Hospital (see Appendix A).

CHAPTER 4

Findings

This EBP project was completed to determine the effects of education on hemoglobin A1C levels during shared medical appointments with type II diabetic patients ages 18-75. The seventh edition of SPSS was used to perform paired sample *t*-tests, as hemoglobin A1C levels followed the normal distribution (Figure 4.1). The objective was to compare the changes in the primary outcome measure of hemoglobin A1C levels. Additional findings of body mass index (BMI), systolic blood pressure, diastolic blood pressure, total cholesterol levels and low-density lipoprotein (LDL) will be presented. A Pearson correlation coefficient was calculated for the relationship between participants' post-hemoglobin A1C levels and age, gender, race, employment and marital status.

Sample Size

Twenty patients that were referred to the EBP project completed the initial shared medical appointment and the follow up shared medical appointment three months later. Initially, 21 patients were referred to the EBP project; however, one participant would not be available for the follow-up appointment, due to seasonal travel to Florida every year for the winter. Because only initial data was collected on this participant, she was not included in the analysis. Consequently, the total number of participants was twenty.

Characteristics

Twenty individuals, ten females and ten males with a mean age of 57.7 years (*SD* = 11.8, range 30-72), completed the intervention. Fifteen of the participants were married (75%), one was single (5%), three were divorced (15%), and one was widowed (5%). Of the sample, eight individuals were retired (40%), six were employed (30%), three were non-employed (15%), and three were disabled (15%). Participants consisted of fourteen Caucasians (70%), four Hispanics (20%), and two African Americans (10%) (Table 4.1).

Primary Outcome

Hemoglobin A1C was the primary variable of interest. The mean HGB A1C at the start of the intervention was 8.68 (*SD* = 1.14, range 7.10-10.90). The mean HGB A1C post-education at the follow up shared medical appointment was 7.91 (*SD* = .991, range of 5.40-9.90). There was a statistically significant difference between the pre-intervention hemoglobin A1C and the post-intervention hemoglobin A1C levels (*p* = .000) (Table 4.2).

Additional Findings

Nonparametric tests were performed on BMI, systolic blood pressure, diastolic blood pressures, total cholesterol levels and LDL as these variables did not follow the normal distribution. Each paired variable was tested with use of the Wilcoxon statistic through the SPSS program. The BMI baseline mean was 35.98 (*SD* = 8.21). The post-BMI mean was 34.87 (*SD* = 7.69). There were differences between the pre-BMI and post-BMI, with statistical significance (*p* = .001). The pre-systolic blood pressure baseline mean was 130.65 (SD = 15.86). The post-systolic blood pressure mean was 128.50 (SD = 7.97). There were no significant differences between pre-systolic blood pressure and post-systolic blood pressure (*p* = .484). The pre-diastolic blood pressure mean was 75.00 (SD = 9.30). The post-diastolic blood pressure mean was 71.90 (SD = 6.37). There were no significant differences between pre-diastolic blood pressure and post-diastolic blood pressure (*p* = 0.064) resulting from this intervention. The pre-cholesterol baseline mean was 196.65 (SD = 50.06). The post-cholesterol mean was 175.40 (SD = 37.28). There were differences between the pre-cholesterol and the post-cholesterol levels, with a statistical significance (*p* = 0.015). The pre-LDL baseline mean was 117.20 (*SD* = 45.34). The post-LDL mean was 98.60 (*SD* = 27.4). There were differences between the pre-LDL and the post-LDL levels, with a statistical significance (*p* = .001) (Table 4.3).

Changes in Outcomes

The primary variable of hemoglobin A1C was evaluated for the effects of education during shared medical appointments. Paired *t*-tests were performed evaluating hemoglobin A1C

statistics, as they followed the normal distribution. Additional findings did not follow the normal distribution, therefore, paired *t*-tests were not completed on these findings and use of Wilcoxon analyses was performed instead.

Statistical Testing and Significance

Paired sample *t*-tests were used to determine if the education intervention provided during shared medical appointments had a significant difference between the variable being measured. Paired *t*-tests were used to make comparisons with the same participants at two different periods of time. Paired *t*-tests were used to determine differences between each patient's hemoglobin A1C results from initial shared medical appointment and a follow-up appointment three months later.

The primary outcome measured was hemoglobin A1C levels. Of the sample, nineteen participants lowered their Hemoglobin A1C levels during the intervention, and one participant's hemoglobin A1C level increased. The additional findings of BMI resulted in eleven participants lowering their BMI, while nine participants stayed the same or increased their BMI scores. However, of those participants that raised their BMI scores, this was not statistically significant. In regards to systolic blood pressure, nine participants demonstrated lower systolic blood pressure, while eleven participants stayed the same or had elevated systolic blood pressure results. Diastolic blood pressure numbers indicated ten participants lowered their diastolic blood pressure, while ten participants remained the same or had elevated diastolic blood pressure results. Additional findings of cholesterol resulted in fourteen participants having lowered their cholesterol levels, while six participants demonstrated higher cholesterol levels. Finally, LDL findings demonstrated that fifteen participants had lowered their LDL levels, while five participants LDL levels remained the same or had elevated.

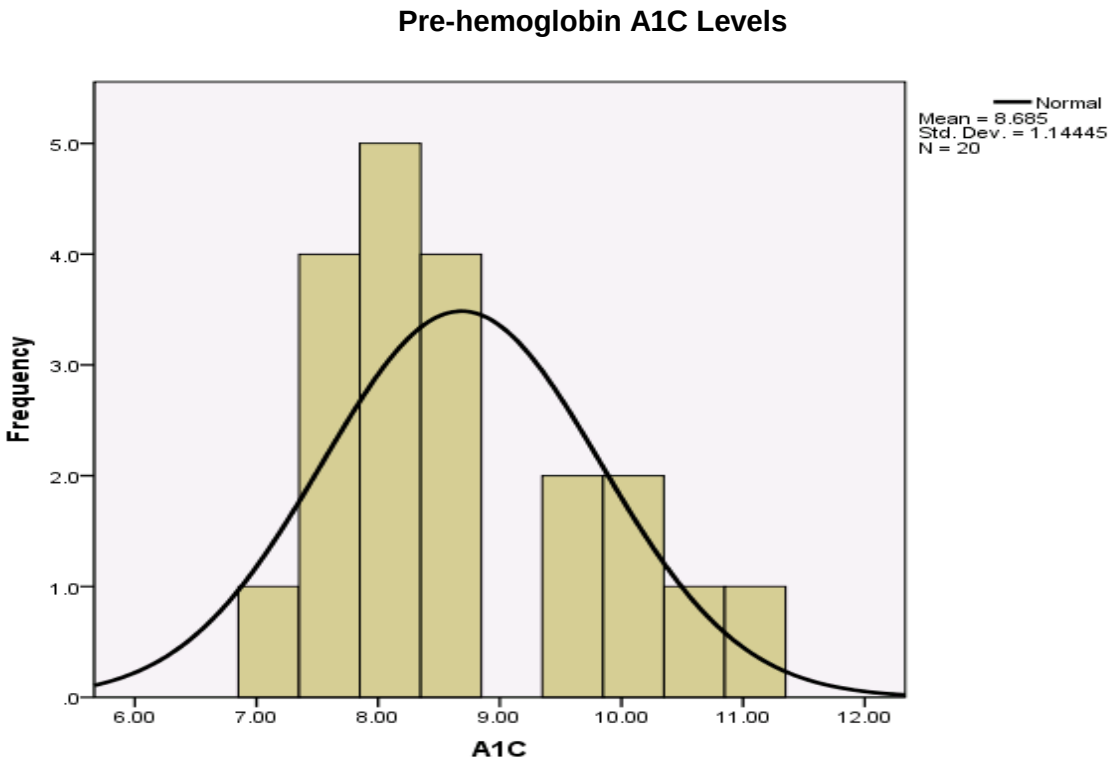
Correlations

A Pearson correlation coefficient was calculated for the relationship between participants' Post-A1C and the following additional outcomes: post-BMI, post-systolic blood

pressure, post-diastolic blood pressure, post-cholesterol, post-LDL levels. There was no statistical significance in correlations between post-A1C and additional outcomes. Correlation between participants' post-hemoglobin A1C and post-BMI was -.591 (p = .16). Correlation between participants' post-hemoglobin A1C and post-systolic blood pressure was .320 (p = .169). The correlation between participants' post-hemoglobin A1C and post-diastolic blood pressure was .415 (p = .069). The correlation between participants' post-hemoglobin A1C and post-cholesterol was .103 (p = .667). Lastly, there was an insignificant correlations between participants' post-hemoglobin A1C and post-LDL of -.098 (p = .681) (Table 4.4).

In summary, paired *t*-tests were completed on hemoglobin A1C levels. Wilcoxon statistically analysis was completed on all additional findings. Correlations were calculated to evaluate relationships between the primary outcome variable and BMI, systolic blood pressure diastolic blood pressure, cholesterol, and LDL levels. Statistics were completed by the project coordinator and was discussed with the project editor. Explanations of the findings are to follow in chapter five.

Figure 4.1 Histogram of Normal Distribution



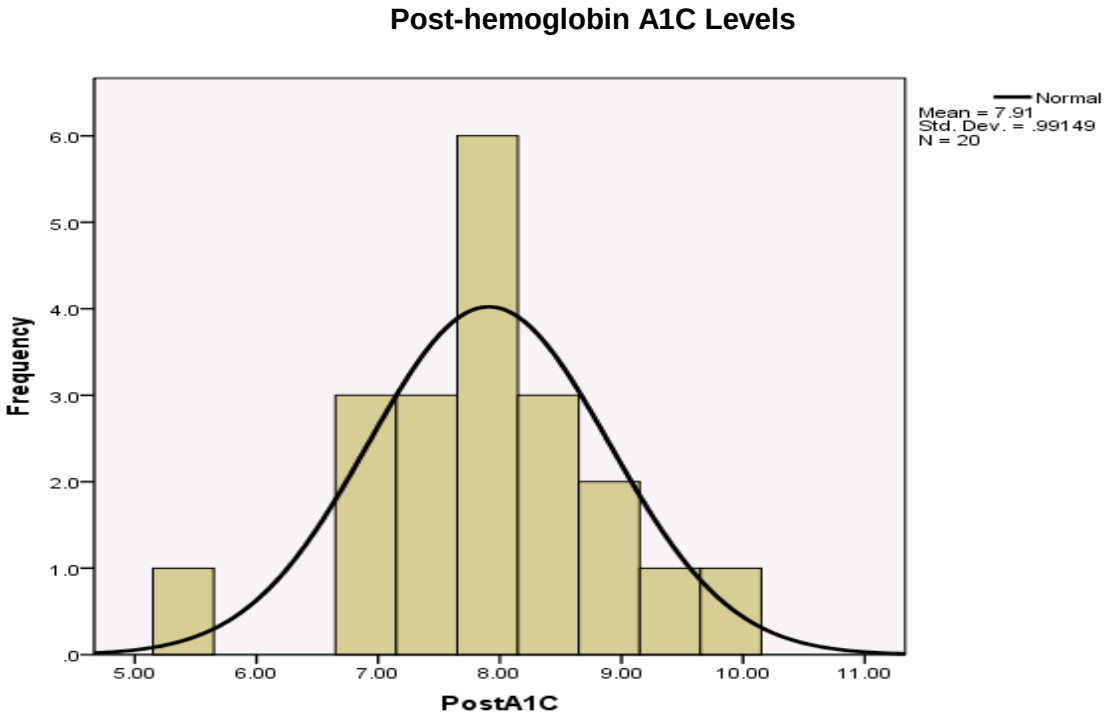


Table 4.1 Project Characteristics

Statistics

		Age	Gender	Race	Employment	Married
N	Valid	20	20	20	20	20
	Missing	0	0	0	0	0
Mean		57.7000	1.5000	1.4000	2.1500	1.5000
Std. Deviation		11.89914	.51299	.68056	1.03999	.9459
Range		43.00	1.00	2.00	3.00	3.00
Minimum		30.00	1.00	1.00	1.00	1.00
Maximum		73.00	2.00	3.00	4.00	4.00
Sum		1154.00	30.00	28.00	43.00	30.00

a. Multiple modes exist. The smallest value is shown

Married

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	15	75.0	75.0	75.0
	Single	1	5.0	5.0	80.0
	Divorced	3	15.0	15.0	95.0
	Total	20	100.0	100.0	

Employment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employed	6	30.0	30.0	30.0
	Retired	8	40.0	40.0	70.0
	Non-employed	3	15.0	15.0	85.0
	Disabled	3	15.0	15.0	100.0
	Total	20	100.0	100.0	

Table 4.2 Primary Outcomes

Paired Samples Statistics

Variable	Mean	N	Std. Deviation	Std. Error Mean	Significance
Pair1					
Pre-A1C	8.6850	20	1.14445	.25591	
Post-A1C	7.9100	20	.99149	.22170	.000

Table 4.3 Nonparametric Test Summary of Correlations between Variables

Variables	**Significance**
Pre-BMI and Post-BMI	.001
Pre-Systolic and Post-Systolic Blood Pressure	.484
Pre-Diastolic and Post-Diastolic Blood Pressure	.064
Pre-Cholesterol and Post-Cholesterol	.015
Pre-LDL and Post-LDL	.001

Table 4.4 Correlations of Primary Outcome (Post- hemoglobin A1C) and Additional Outcomes

Outcomes	**Correlation**	**Significance**
Post-A1C and Post-BMI	-.591 Strong	.16
Post-A1C and Post-systolic Blood Pressure	.320 Moderate	.169
Post-A1C and Post-diastolic Blood Pressure	.415 Moderate	.069
Post-A1C and Post-cholesterol	.103 Weak	.667
Post-A1C and Post-LDL	.-.098 Weak	.681

Chapter 5

Discussion

The purpose of this EBP project was to evaluate the effectiveness of education during shared medical appointments compared to routine office visits with a health care provider. The primary goal was to achieve a change in hemoglobin A1C levels. What was found in this EBP project replicated what has been found in the literature review. Simmons and Kapustin's (2011) integrative review examined 18 articles and found shared medical appointments for diabetes had positive impacts on achieving lower hemoglobin A1C levels. Additional outcome measures from this EBP project included: (a) BMI, (b) systolic blood pressure, (c) diastolic blood pressure, (d) cholesterol levels, and (e) LDL levels. The shared medical appointments took place over a course of four months. The PICOT question for this project was "in adult type II diabetic patients, what is the effect of education with a shared medical appointment on outcome measures of hemoglobin A1C levels over a three month period, compared to usual care during a traditional office visit"?

This chapter provides an explanation of the project findings from Chapter Four, evaluates the use of the Chronic Care Model which was the theoretical framework that guided this EBP project, and discusses of the Stetler Model that was the Evidence-Based Framework utilized to evaluate appropriate literature. This chapter reflects upon the strengths and limitations of the project, and discusses the implications for advance practice nurses. Finally, recommendations for future research are discussed.

Explanation of Findings

Baseline data was received at the time of the referral to this EBP project for each individual; these results came from their recent health care provider visit. Individuals participated in the shared medical appointment where education was provided and the follow-up hemoglobin A1C was collected three months later and reviewed during the follow-up shared medical appointment. Analysis of descriptive statistics and paired sample *t*-tests were completed using

SPSS statistical program, seventh edition. Data collection and analysis specifically examined individual's hemoglobin A1C levels which was the primary outcome. Additional findings were analyzed with Wilcoxon Statistical analysis to assess additional findings of interest from the education provided during shared medical appointments.

Primary Outcomes

The majority of the individuals that participated in the shared medical appointments lowered their HGB A1C levels (n = 19). There was one individual that had a higher HGB A1C level at the follow-up SMA. The paired *t*-test was calculated to compare the mean initial HGB A1C score to the mean follow-up HGB A1C score. The mean on the initial HGB A1C was 8.68 (SD = 1.14), and the mean on the follow-up HGB A1C was 7.91 (SD = .991). A statistically significant difference in hemoglobin A1C levels was found between the initial and follow-up shared medical appointment (p = .000). The results of this EBP project replicated what was found in the literature. Evidence supported that education during shared medical appointments had a positive outcome by a reduction in hemoglobin A1C levels which can improve in health for those with diabetes (American Diabetes Association, 2013; Housden et al., 2013; Simmons and Kapustins, 2011; Zhang et al., 2012).

Additional Findings

Additional findings were analyzed using the Wilcoxon statistic, as this data did not follow the normal distribution. The first additional finding was BMI. Eleven of the individuals that participated in the SMA lowered their BMI. There were nine individuals that did not decrease their BMI scores. The mean pre-BMI score of 35.98 (SD = 8.21) was compared to the mean post-BMI score of 34.87 (SD = 7.69).Demonstrating a statistical significant change in BMI as a result of the SMA intervention. When considering changes in BMI from traditional office visits and care received during this intervention, the results were statistically significant. This may be the result of the education that was provided during the shared medical appointments, time spent reviewing nutrition, carbohydrate counting, label reading; and this intervention increased

patients involvement in his/her own care while empowering patients in their care. This intervention, assisted participants in developing behavior goals; and discussed diet, medications, exercise and lifestyle that may have had an impact on outcomes. The results of the literature review found evidence which supports weight loss (BMI) as an outcome for overall improvement in health for those with diabetes (Deakin et al., 2006).

The systolic blood pressure lowered in nine individuals and eleven individuals systolic blood pressure had no change. There were no significant change found in pre-systolic blood pressure and post-systolic blood pressure ($p = .484$). The literature review had various outcomes on systolic blood pressure. Positive outcome measures were found in the literature in regards to shared medical appointments with improved systolic blood pressure scores (Housden et al., 2013; Kirsh et al., 2007). In contrast, several findings from the literature review resembled what was found in this EBP project ($p > 0.05$) (Reitz et al., 2012; Cade et al., 2009). One explanation for systolic blood pressure not having a significant change in this EBP project could be related to the overall initial systolic blood pressure means of 130.65 and the post mean of 128.50; both means are within the recommended treatment goal set by the American Diabetes Association. “People with diabetes and hypertension should be treated to a systolic blood pressure goal of <140 mmHg” (American Diabetes Association, 2013, p. S29). Results may have been different if the small sample size was greater than 20 participants.

The diastolic blood pressure was another additional finding of interest. Ten individuals lowered their diastolic blood pressure and ten individuals diastolic blood pressure had no change. The mean pre-diastolic blood pressure of 75.00 (SD = 15.86) was compared to the mean post-systolic blood pressure of 71.90 (7.97). There was no statistical significant change in diastolic blood pressure ($p = 0.64$). The literature review had various outcomes on diastolic blood pressure. Positive outcome measures were found in the literature in regards to shared medical appointments that improved diastolic blood pressure scores ($p < 0.05$) (Housden et al., 2013; Kirsh et al., 2007). In contrast, several findings from the literature review resembled what

was found in this EBP project ($p > 0.05$) (Reitz et al., 2012; Cade et al., 2009). Hypertension is a common comorbidity of type II diabetes. Any improvement in blood pressure in those with type II diabetes leads to improved diabetes outcomes. According to the American Diabetes Association (2013), evidence shows that "randomized clinical trials have demonstrated the benefit (reduction of coronary heart disease (CHD) events, stroke, and nephropathy) by lowering blood pressure" (p. S29). Blood pressure changes were not expected in this intervention. The initial systolic and diastolic means and follow-up systolic and diastolic means were all within normal ranges, according to recommendations of the American Diabetes Association (2013).

Patients with type II diabetes have an increased prevalence in cholesterol abnormalities that contribute to risk of cardiovascular disease (CVD). Cholesterol levels were another finding of interest. The pre-cholesterol mean of 196.65 (SD = 50.06) was compared to the mean post-cholesterol of 175.40 (SD = 37.28). There were statistically significant differences between the pre-cholesterol and post-cholesterol levels ($p = 0.015$). According to Ridge (2012), shared medical appointments have been suggested as an alternative to traditional office visits with a health care provider. Shared medical appointments are group visits that integrate diabetes self-management education, training and peer support that leads to improved diabetes care and prevention of comorbidities such as hypertension and lipid disorders. "Studies indicate the quality of diabetic care in the U.S. is sub-optimal, and few patients (<10%) are treated to recommended therapeutic targets for blood sugar, blood pressure and lipids – critical clinical indicators are needed for prevention of micro- and macro-vascular complications of diabetes" (Stanton, 2008, p. 5). Several explanations for the changes in cholesterol outcomes could be related to the amount of time in discussion, education on nutrition and exercise; and encouragement of active participation of each individual in the group setting. The project coordinator and dietician stressed the importance of nutrition, and every participant left the shared medical appointments with personal meal plans. Self-management support provides

opportunities for patients to be empowered and prepared to manage their diabetes and health care needs.

The final finding of interest was LDL cholesterol. The pre-LDL mean of 117.20 (SD = 45.34) was compared to the mean post-LDL of 98.60 (SD = 27.4). This reduction was statistically significant (p = .001). Education is the primary intervention during shared medical appointments. Lifestyle modification focusing on the reduction of saturated fats, cholesterol intake, along with weight loss should be recommended to improve lipid profiles in patients with diabetes (American Diabetes Association, 2013). “Meta-analyses including data from over 18,000 patients with diabetes from 14 randomized trials of statin therapy, followed for a mean of 4.3 years, demonstrated a 9% proportional reduction in all-cause mortality, for each mmol/L reduction in LDL cholesterol (American Diabetes Association, 2013, p. S31). Simmons and Kapustin (2011) discussed that diabetes group visits are an alternative to managing chronic disease outcomes. Simmons and Kapustin’s integrative review reported “73% patients significantly lowered A1C (average decreased from 12.1% to 8.3%), adequate BP control rose from 15% to 38% of cases; LDL levels decreased in > 60% cases” (Simmons & Kapustin, 2011, p. 674). Results of cholesterol and LDL levels may take longer for physiological changes to occur in the body when there is a decrease in hemoglobin A1C levels, which eventually carry over in cholesterol and LDL levels.

Pearson correlation coefficients were calculated for the relationship between participants’ post-hemoglobin A1C and the following additional outcomes: post-BMI, post-systolic blood pressure, post-diastolic blood pressure, post-cholesterol, post-LDL levels. There was a strong negative correlation between participants’ post-hemoglobin A1C and post-BMI, yet it was not statistically significant. Participants’ post-hemoglobin A1C and post-systolic blood pressure had a moderate correlation of .320, and no statistical significance. Participants’ post-hemoglobin A1C and post-diastolic blood pressure had a moderate correlation of .415, and there was no statistical significance. Correlation between participants’ post-hemoglobin and

post-cholesterol had a weak correlation of .103. Finally, participants' post-hemoglobin A1C and post-LDL had a weak correlation of -.098. This intervention found varied correlations between participants post-hemoglobin A1C and additional outcomes, yet there was no statistical significant differences found. Again, one explanation for the weak correlation of cholesterol and LDL may be that results of cholesterol and LDL levels may take longer for physiological changes to occur in the body. Recommendations would be to continue shared medical appointments with the same additional outcomes and evaluate of there would be a stronger correlation if there was 6 months between interventions; and of a decrease in hemoglobin A1C levels, eventually carry over in cholesterol and LDL levels.

Answering the Clinical Question

In summary, this EBP project successfully answered the PICOT question. Individuals who have type II diabetes and participate in shared medical appointment visits lowered their hemoglobin A1C levels compared to a traditional visit with a primary health care provider. The primary outcome measure of hemoglobin A1C levels demonstrated statistically significant changes (p = .000).

Unanticipated Outcomes

An unanticipated outcome occurred during this intervention. There were eleven participants (55%) that lowered their BMI and nine participants (45%) that did not change their BMI, yet findings were statistically significant (p = .001). It was interesting that these individuals came to the initial shared medical appointment where education was provided on complications of diabetes, hypertension, lipids and obesity, and yet 45% of the individuals did not lose weight. In contrast, even with 45% of the participants not changing their BMI, there was a statistical significant change in cholesterol levels (p = 0.015) and LDL levels (p = .001). One explanation for these findings may contribute to the education that was provided during the shared medical appointment on behavior modification as an important component of diabetes care. Education

was provided on carbohydrate counting and all handouts followed the American Diabetes Association recommendations.

Evaluation of the Applicability of the EBP Framework and Theoretical Framework

The Stetler Model was designed to be a practical approach for integrating research finding into EBP for the individual health care provider (Stetler C. B., 1994). The five phases of the Stetler Model guided the development and implementation of this EBP project. Utilization of the Stetler Model includes a series of five phases which are: (a) preparation, (b) validation, (c) comparative evaluation/decision-making, (d) translation/application, and (e) evaluation. Each phase was created to facilitate critical thinking about the practical application of research findings (Melnyk & Fineout-Overholt, 2011). Three key activities that were associated with successful implementation of this EBP project were as follows: (a) establishing a new culture of care, such as shared medical appointments, for use of this EBP; (b) creating the capacity for members of an organization, such as the primary care practice providers that this EBP project was completed to adapt and change the way of care for diabetes patients; and (c) altering the organizations infrastructure to sustain the change. This EBP project incorporated each of these activities to promote a change in the way health care providers deliver medical care for type II diabetic patients within a family practice setting. Strength of the Stetler Model was the appropriate fit to the development of this EBP project and provided a good foundation to build evidence upon. There were no weaknesses of this model found when applying to the shared medical appointments.

The Chronic Care Model (CCM) was the theoretical framework that guided this EBP project. The CCM was designed to build on the interrelationships between six evidence-based pillars that lead to improved clinical quality and outcomes in regards to disease management. It has also improved care in health systems at the community level, health care organizational level, primary care/practice level, as well as the patient level (Wagner, Austin, Davis, Hindmarsh, Schaefer, & Bonomi, 2012). Use of Chronic Care Model elements is associated with

higher-quality care for diabetes. Nutting, Dickinson, Nelson, King, Crabtree, & Glosgow (2007) reported that health care providers who utilized elements of CCM were significantly associated with lower hemoglobin A1C levels (p = .002). In addition, health care providers who incorporate elements of the CCM into the practice were also significantly associated with positive behavioral changes and improved outcomes in diabetes care (Nutting et al., 2007). Wagner et al., (2012) reported that the CCM is an evidence-based guideline and a synthesis of system changes to guide quality improvement in health care and patient outcomes. Patients that participated in a shared medical appointment guided by the CCM for diabetes disease management were more likely to receive patient-centered, patient-structured, and quality collaborative care (Szecsenyi, Rosemann, Joos, Peters-Klimm, & Miksch, 2008). Strengths of the CCM and SMAs included several major elements: (a) provided effective delivery of care (indicated by a change in hemoglobin A1C levels); (b) facilitated self-management of care (empower patients to take charge of one's own health care); (c) evidence-based tools and techniques were provided (ADA guidelines for care and nutritional individual needs), while controlling costs and allocating resources; and (d) system for improving the quality of care for individual patients and populations (shared medical appointments) (Kirsh & Aron, 2008). Strengths of the CCM relates to a system-based approach to management of chronic diseases, such as diabetes, that can serve as a model for linking high-quality of care and high-quality training in system-based practice. An additional strength with the CCM is patient empowerment. Patients in a SMA must communicate with patients as a facilitator of patient to patient communication. This is a skill for patients which advocate a patient-centered approach as opposed to a lecture type format that exists in traditional office visits (Kirsh & Aron, 2008). One limitation of the CCM may be that health care providers are not aware of this model as it has only been utilized in health care since 2001, compared to other theoretical models that have been utilized and tested for decades. In regards to shared medical appointments and the CCM, another limitation may be

that some patients do not feel comfortable in groups and speak freely and honestly in regards to personal health and lifestyle practices.

Strengths and Limitations of the EBP Project

Implementation of this EBP project was supported by the staff and health care providers within the family practice setting where this intervention was completed. Health promotion and disease prevention are valued by this health care team and shared medical appointments provided another method to reach goals and improve outcomes. Strengths in this EBP project also can be considered as participants that met the inclusion criteria were all familiar with the project coordinator, so there may have been some additional comfort in attending. An additional strength of this EBP project was the low attrition rate. Twenty-one patients met inclusion criteria and attended the initial shared medical appointment; yet, one of the participants informed the project coordinator at the end of the initial visit that she would be in Florida for the follow-up visit; therefore, she was not included in the project findings. SMAs have a potential to assist health care providers meet the increasing demand for health care and represent a novel approach to management of chronic diseases such as diabetes.

This intervention has a number of limitations. The sample size was small and carried out in a single family practice by a single group of facilitators. This was a new project to the facility and may have been subject to the Hawthorne effect. The Hawthorne effect is when subjects are influenced by participating in a study. According to Schmidt and Brown (2009), “the behaviors of subjects in a study may be affected by their personal values, their desires to please the experimenter or provide the results the experimenter wants, and whether the study is congruent with their personal interests and goals (Schmidt & Brown, 2009, p-133).

This intervention should be considered as a pilot project. Additional shared medical appointments need to be completed with a group of 30 patients or more to see if the results are reproducible and reliable. The timeline of this EBP project was from initial SMA to follow-up SMA of three months; however, three months does not allow for permanent change. There are

few long-term studies examining the effectiveness of shared medical appointments for diabetes care. Therefore, the long-term or sustainable outcomes of shared medical appointments are unclear, and it is unknown if the outcomes would be maintained for a substantial length of time after the intervention (Housden, Wong, & Dawes 2013).

Implications for the Future

Individuals with poorly controlled type II diabetes contribute to a major public health problem in the United States. Inadequately controlled diabetes correlates with comorbidity, disability, premature death, and decreased quality of life (American Diabetes Association, 2013). The primary objective for this EBP project and therapeutic goal for prevention of acute and chronic complications of diabetes is glycemic control. The reviewed evidence supports the implementation of shared medical appointments to improve health care provider interventions for adult type II diabetic patients within a primary care setting.

Practice / APN role or Professional Nurse

Implementing shared medical appointments in primary care practice can provide an organized approach to deliver care and meet the standards of care for diabetes. “Although PCP’s are busy caring for patients with many disease states each day, SMAs create a focus that can be used to organize and streamline care while continuing to individualize treatment to improve patient outcomes” (Ridge, 2012, p. 74). Services from care teams that include APNs, compared to services from care teams without APNs, have higher self-care behaviors and lower cost of care services (Duangbubpha, Hancharurnkul, Pookboonmee, Orathai, & Kiatboonsri 2013). The doctorally prepared advance practice nurse possesses the knowledge and skills necessary to effectively implement EBP within primary care settings to promote quality in health care.

Theory

The chronic care model and shared medical appointments were used in this intervention to educate type II adult diabetic patients between the ages of 18-75. Presently, the use of the CCM

and advance practice nurses are recognized as important strategies for dealing with comprehensive chronic disease such as diabetes (Duangbubpha et al., 2013). In the next decade, the impact of chronic illness on health care and health care cost drive the health care system to explore strategies such as the use of SMAs and CCM, to improve patient satisfaction and improve patient outcome scores. The CCM has provided guidance in regards to chronic illness such as diabetes, as well as, a systematic approach to improve care (Wagner et al., 2012).

Research

According to Coleman and colleagues (2009), evidence suggests that "some type of external incentive and quality improvement support may be essential for widespread practice change" (p. 80). Evidence from the literature complimented results from this EBP project. Nursing research is needed to determine if improved quality of care persists following completion of this EBP project. The data from this evidence-based intervention had favorable outcomes in regards to hemoglobin A1C, BMI, cholesterol levels and LDL. Future research needs to focus on the prevention of type II diabetes within the primary care setting. Additional research is needed, regarding cost-effectiveness of shared medical appointments. Studies examining the difference between individual traditional office visits and group visits with the same patients, same number of visit, the same providers, and a standard education curriculum provided to both groups would be of interest (Ridge, 2012).

Education

Primary care providers focus on episodic care because the current payment system penalizes providers for spending more time to manage chronic diseases, like diabetes. Care coordination needs to be a priority for health care providers, such as APNs, involved in patient care to facilitate the appropriate delivery of care needed (Zhang et al., 2012). Based on the successful use of CCM during shared medical appointments in this intervention that assisted individuals in making positive lifestyle changes; a recommendation would be to include APNs in

education programs for health care. An additional recommendation would be to develop shared medical appointment programs, directed by APNs, for diabetes as well as various chronic diseases, such as, chronic obstructive pulmonary disease, cardiovascular disease, dysmetabolic syndrome, and obesity. An extensive review of the literature in regards to CCM and SMAs was completed. To continue use of the CCM and SMA model, educational programs for primary care providers need to be developed and disseminated to increase awareness and success when treating patients with diabetes by assisting patients to make lifestyle changes.

Conclusion

Millions of people worldwide are affected by type II diabetes. Approximately 25.8 million or 8.3 percent of the U.S. population has type II diabetes. The number of adults in the United States developing diabetes has been projected to double by the year 2030. Diabetes is the leading cause of kidney failure, blindness, as well as a major cause of heart disease and stroke, which is the 7th leading cause of death in the U.S. (World Health Organization, 2013). This devastating prevalence of diabetes and evidence that many of the factors leading to diabetes can be revised or prevented should encourage health care providers to find interventions to educate and improve health care outcomes. This EBP project answered the PICOT question: In type II adult diabetic patients, ages 18-75, what effect does education have on hemoglobin A1C levels through shared medical appointments, compared to traditional office visits over a three month period?

After critical analysis of the literature, evidence was found to support the use of shared medical appointments for the care of adult type II diabetics. Of the total group of participants (N = 20), 19 individuals changed hemoglobin A1C levels. The outcomes of this EBP project was favorable to education being provided during shared medical appointments (p = .000). Additional outcomes of interest indicated that positive changes were noted in BMI (p = .001), cholesterol levels (p = 0.015), and LDL levels (p = .001). Outcomes that did not indicate a statistical significance were systolic blood pressure and diastolic blood pressure.

The use of the chronic care model assisted the project coordinator with guidance during the shared medical appointments. However, the duration of the project was only three months and further research needs to be completed to ensure that shared medical appointments have long term benefits and to determine if lifestyle modifications were maintained. Further research with continued shared medical appointments over a period of a year to evaluate for continuity of care is recommended.

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BIOGRAPHICAL MATERIAL

Gina L. Moore

Ms. Moore graduated from Purdue University with an associate degree in the science of nursing in 1985. She worked as a supervisor in various settings such as a skilled nursing home, then a family practice clinic before attending Bethel College for her baccalaureate degree in nursing in 1998. She continued her education at Valparaiso University, obtaining her master's degree as a clinical nurse specialist in December of 1999 and her post-masters certificate as a family nurse practitioner in May of 2000. Ms. Moore began pursuing her Doctorate of Nursing Practice degree and is anticipating completion May of 2014. Ms. Moore is a member of Sigma Theta Tau International-Zeta Epsilon chapter. She also is a member of ANCC in which she is board certified as a family nurse practitioner. In addition, Ms. Moore is a member of the American Heart Association, American Diabetes Association, and the American Association of Diabetes Educators in which she is a certified diabetes educator (CDE) since 2007. Ms. Moore has been a clinical instructor for Valparaiso University for undergraduate and graduate students since 2009. As an experienced family nurse practitioner, Gina has focused on diabetes care. Due to her experience in a family practice clinical setting managing clients suffering from the life-changing consequences of diabetes, she has become quite passionate about diabetes prevention and education. Gina is devoted to the application of evidence-based practice regarding diabetic patients' shared medical appointments with the ultimate goal of education and prevention of the complications of this disease. She presented this EBP project at the Northwest Indiana Nursing Research Consortium in 2013. Future goals will be to continue as a clinical instructor at a university level and expand diabetes services and education in the family practice setting utilizing evidence-based practice.

ACRONYM LIST

ADA: American Diabetes Association

AGREE II: Appraisal of Guidelines for Research and Evaluation

APN: Advance Practice Nurse

BMI: Body Mass Index

CBC: Complete Blood Count

CCM: Chronic Care Model

CDC: Centers for Disease Control and Prevention

CDE: Certified Diabetes Educator

CHF: Congestive Heart Failure

CMP: Comprehensive Metabolic Panel

COPD: Chronic Obstructive Pulmonary Disease

DNP Student: Doctor of Nurse Practice Student

EBP: Evidence-Based Practice

EMR: Electronic Medical Records

EPP: Expert Patient Program

GMV: Group Medical Visit

HGB A1C: Hemoglobin A1C

IRB: Institutional Review Board

LDL: Low Density Lipoprotein

NP: Nurse Practitioner

PCMH: Patient Centered Medical Home

PCP: Primary Care Provider

RCT: Randomized Control Trials

SBP: Systolic Blood Pressure

SMA: Shared Medical Appointment

TSH: Thyroid Stimulating Hormone

U.S.: United States

WHO: World Health Organization

X-PERT: Patient-Centered, Group-Based, Self-Management Program

Appendix A

IRB and EBP Project Guidelines

Shared Medical Appointment

Study Title: Shared medical appointments in adult type II diabetic patients

Start Date: Sept 1. 2013 **End Date:** Feb. 1. 2014 **Project Type -** EBP

Primary Investigator/EBP Project Coordinator: Gina Moore CNS, FNP-BC, CDE

Department: Family Practice/Nursing

Telephone Number Office #: 574-936-7777 **Cell:** 574-274-8578

Email Address: gmoore9@iuhealth.org

If Student - Name of University: Valparaiso University

If Student - Name of Faculty Advisor with Credentials: Kristen L. Mauk, PhD, RN, CRRN, GCNS-BC, GNP
Email: kris.mauk@valpo.edu

Study Information

Background Information:
Diabetes affects 25.8 million people or 8.3% of the U.S. population. Approximately 35% of the U.S. has been predicted to have pre-diabetes. Diabetes is the leading cause of kidney failure, lower limb amputations and new cases of blindness among adults in the United States. Diabetes is a major cause of heart disease and stroke and the 7th leading cause of death in the United States (U.S. Department of Health and Human Services, 2012).

According to the World Health Organization (WHO), it has been estimated that the number of adults in the United States that will develop diabetes will double by the year 2030 (World Health Organization, 2013). Health care costs associated with diabetes are estimated currently in Indiana at around $4 billion health care dollars annually (The Department of Health and Human Services, 2011).

Shared medical appointments (SMA) also termed, group visits, can be an innovative approach to diabetic care. Shared medical appointments may be used in combination or in place of the usual one-on-one traditional care given by a health care provider. The SMA typically will include a group of patients, from 4-6 at a time, group education, shared problem solving, focused private medical examination that will allow some individual time with the health care provider. Appointments may last from 90-120 minutes depending on the number of patients at each session. Patients' will have the opportunity in the group environment to learn or provide encouragement and advice to other attending that they may not have received in a short traditional office visit.

EBP project of Shared Medical Appointments: Literature review has found that the shared medical appointment model has been utilized since 2002 and previous studies have conflicting results indicating positive benefits as well as a few studies indicating no benefits in regards to lowering of the hemoglobin A1C levels.
Extensive review of the literature indicated that health care systems in support of the shared medical appointments found positive benefits assiciated with hemoglobin A1C reductions of at least 1% during a 3-6 month period (Stellefson, Dipnarine, & Stopka, 2013). The shared medical appointments will include group education, shared problem solving, focused private medical examination that will allow some individual time with the project coordinator/NP. Appointments may last from 90-120 minutes depending on the number of patients at each session. Patients' will have the opportunity in the group environment to learn or provide encouragement and advice to other attending that they may not have received in a short traditional office visit.
We are not creating a new model; this project will be replicating what has been found in the literature.

Study Purpose/Objectives: To evaluate the educational benefits of shared medical appointments with adult diabetic patients in relationship to hemoglobin A1C levels over a 3 month period.

Research Questions (omit if EBP project): NA

Study/EBP Design: Educational intervention utilizing the shared medical appointment model. There will not be a control group.

Setting: Family Practice that houses four health care providers in Marshall County

Sample: Adults 18-75 years of age

Ethical Considerations/Potential Risks to Participants: There may be a minimal psychological discomfort when in the group setting, yet the benefits may be improved understanding of diabetes care, and improved overall health and hemoglobin A1c levels.

Methods as Follows:

Referral basis: Patients may be referred to this project by any of the four health care providers within the family practice of interest (1-MD and 3-NP's).

Population of Interest: Adult type II diabetics, between the ages of 18-75.
Inclusion Criteria: Adult diabetics that need improvement of their diabetes health and with a Hemoglobin A1C over 6.5. Standard of care will follow recommendations from the ADA that adult diabetic's goal for Hemoglobin A1C levels are less than 6.5. The goal is that 3-4 patients will be in each group setting (which will be every Friday am) with a total of around 20 patients will be part of this project. They will be included in the first SMA and then repeat education 3 months later.
Exclusion Criteria: Children or teens less than 18 years of age and adults that cannot read or write in English.

Pre-Physical History Form: Once a referral has been made, each patient prior to scheduling patients in the shared medical appointment project will need to fill out this form. This form will include education level and literacy level, in which if patients are unable to read they will be excluded from the project. (Form attached) This project will have an education component and

forms will be provided for patients to participate in the project and the ability to read is necessary.

It is standard practice for this family practice to obtain hemoglobin A1C levels every 3 months and these results are what will be evaluated during the shared medical appointments (initial as well as 3 months later).

Project Procedures: Will include the following:

Associate Staff: Will bring patients back one at a time into an individual exam room for evaluation of vitals and preparation for the health care provider. Patient while waiting in the examination room will be given a confidentiality form to review and sign prior to entering the shared medical appointment area. (Form attached) Associate staff will not be providing primary education. The primary purpose of the associate staff is preparation of care.
All the associate staff has been given education by the project coordinator according to the standards of the ADA. All material in regards to nutrition and carbohydrate counting will follow the ADA recommendations and standardized forms (American Diabetic Association, 2013).

EBP Project Coordinator: Will obtain all the participants charts with lab results along with problem lists and medication histories. Measurements of hemoglobin A1C levels will be measured at baseline before the first shared medical appointment and then at 3 months. Project coordinator will be providing all primary education during the shared medical appointments.

Examination: There will be a brief exam on each patient and then they will be taken to the community room for the group education.

Education: There will be a brief power point given to the group on types of diabetes, complications of disease, brief explanation of the types of medications, diet and exercise. Question and answer time will be provided for the group. Everything that will be presented will be according to the ADA standards and / or found in the literature as guidelines.

Review of Chart and laboratory Results: The project coordinator will talk with each patient individually on their own medications and laboratory results, and then they will return to the group.
During the time the project coordinator is with individual patients (within the same room as others in attendance) the associate staff will be handing out nutritional forms on diet in regards to standardized forms as mentioned above.

Educational Benefits: The educational benefits are the hope that with education within a shared medical group will have results of lower hemoglobin A1C levels and patients discover or develop use of their innate ability to gain mastery over their diabetes. Literature review indicates that patients can offer assistance to other patients during a shared medical appointment with emphasis on patient self-management by offering their own personal successful lifestyle management strategies.

Conclusion of session: After the chart and laboratory review with each individual patient, there will be recommendations provided to each patient's primary health care provider.

Data Analysis: Descriptive statistics will be calculated by the project coordinator utilizing the SPSSX

Dissemination: Poster presentation and presentation on findings at end of EBP

Implications for Nursing: To evaluate if utilization of education during a shared medical appointments improve hemoglobin A1C levels.

Appendix B

Shared Medical Appointments

Outline

A shared medical appointment (SMA) or group visit is a medical appointment held by a health care provider in a medical office setting. The health care provider is supported by other professionals in regards to various educational needs during the appointment that may last 90 minutes or longer to provide routine or follow up care for groups of patients at one time. SMAs allow the health care provider and health care team the opportunity to address patient needs outside the confines of today's shortened one-on-one traditional office visits.

Group visits are now considered an important component of the Chronic Care Model that combines medical care, patient education and patient empowerment in a group office setting. SMAs share features as they are voluntary, interactive, care delivery systems and empower patients as their own caregivers, in addition to being efficient and effective.

SMAs benefits are as follows:

- Provide more time for patient visits
- Increase patient education and opportunity for patients to ask questions
- Peer support, help and encouragement for other patients in the group
- Identification of potential psychosocial issues and steps for appropriate follow up
- Greater efficiencies by providing the health care provider the opportunity to provide some information to a group that might otherwise be delivered in multiple one-on-one appointments
- Improved management of busy practices that do not have time to provide education during routine visits

SMA time frame (approximately 90-120 minutes)

- Patients begin to arrive, check-in and sign confidentiality document, and one placed in exam room for health care provider to exam briefly (heart, lungs and feet).
- Each examined patient returns to the designated group room, where the medical assistant reviews educational forms and discusses handouts.
- Health care provider enters group room at the completion of all physical exams, reviews briefly the power point presentation on diabetes, then addresses individual patient concerns and reviews labs with each individual patient, while education is continued with other group members.
- Questions are answered and SMA session ends.

Appendix C

Shared Medical Appointment, Patient Information

Welcome to the Shared Medical Appointments (SMA). We are very excited to offer this new approach to treating diabetes. Our goal is to help give you tools to improve your quality of life as well as manage your diabetes.

A Shared Medical Appointment allows you to spend time with a health care provider and staff, as well as other patients who have diabetes. The time spent will provide you with more time for questions and concerns in a relaxed, educating and supportive setting, compared to the traditional office visit which has time limits.

This new approach of sharing your concerns with health care providers and others facing diabetes can also give you the motivation needed to better manage your diabetes.

This appointment is not a support group or group counseling session, lecture or health talk. This appointment is a new way to treat diabetes, in which benefits may improve your understanding about diabetes, new ways to treat diabetes as well as encouraging your active participation in your own health care needs.

We look forward to spending time with you and helping you take new steps in controlling your diabetes.

Gina Moore CNS, FNP-BC, CDE

Appendix D

Consent Form

Shared Medical Appointment

Project Title: Shared medical appointments in adult type II diabetic patients.

Project Coordinator: Gina L. Moore, CNS, FNP-BC, CDE
DNP student, Valparaiso University

Purpose: I, _____, understand that I am being asked to participate in a shared medical appointment with other individuals, which will include nutritional education and review of my medical status regarding diabetes. The primary focus will be on patient education to assess changes in the delivery of primary care that may have benefits with reductions on hemoglobin A1C levels.

Procedure: The EBP project will provide participants, education on diabetes, individual examinations, general review of nutrition and diet. Then recommendations will be provided to each patient's primary care provider.

Risks: There are no physical risks to participating in the shared group appointments. There will be no invasive techniques. There may be a risk of patients being uncomfortable when discussing their lifestyle and diet practices.

Benefits: Better understanding about diabetes and goal of improved Hemoglobin A1c levels.

Voluntary participation/withdrawal: I understand that participating in shared medical appointments is my choice and I am free to stop at any time without penalty.

Questions: If I have any questions about my participation in shared medical appointments, I understand I can contact Gina Moore, at 574-936-7777. If I have any questions about my rights, I can contact Dr. Julie Brandy, Chair of the Institutional Review Board at Valparaiso University at 219-464-5289.

Confidentiality/anonymity: Although my participation in the shared medical appointments will be reviewed by the project coordinator to see if there is benefits in diabetes care, my name and other facts that would identify me will be kept strictly confidential.

Consent to participate in the evidence-based practice project: I have read all the above information about the EBP project in regards to shared medical appointments, including the procedure, possible risks and benefits to me, and I understand them. All of my questions have been answered. I give my consent freely, and offer to participate in this project.

Participant Signature: _____ Date: _____

Project Manager Signature: _____ Date: _____

Appendix E

Shared Medical Appointments
Privacy and Confidentiality Statement

Privacy and confidentiality are concerns shared by everyone who participates in a shared medical visit. You, as well as all our patients, have the right to expect that what you say during this shared visit remains private and confidential. Privacy of your health information is important and vital to IU Health and is mandated by law.

Normally, the information that you discuss during an individual appointment is protected by the patient-physician relationship. However, this confidentiality privilege will change when you discuss the same information in a group setting. Because shared medical appointments involve patients disclosing private medical or social information, all participants in a shared medical appointment, including the patient and any accompanying caregiver or family member, must agree to respect the privacy and confidentiality of all participants.

By signing this privacy and confidentiality statement, you agree to respect and protect the privacy and confidentiality of other members participating in today's appointment by not revealing medical or any other identifying information after the session is over. Additionally, you agree that IU Health shall not be considered liable for any financial or other damages resulting from any breach of confidentiality committed by other participants in the shared medical appointment.

Signatures below indicate I have read, understand, and agree to all proceeding information.

Patient Signature: _____ Date: _____

Project Coordinator: _____ Date: _____

Appendix F

Pre-Physical History Form for Shared Medical Appointments

Patient Name: _____Date: _____Date of Birth: _____

Referred By / Primary Care Provider: _____

Date of Birth: _____ Last completed year of school: _____

Read and Write in English: _____Yes _____No

Medical History: Please check any of the problems below that you have or have had.
_____Anemia _____Arthritis _____Asthma _____Cancer

_____Constipation _____Depression _____Emphysema _____Epilepsy

_____Heart Disease _____Hepatitis _____High Blood Pressure

_____Headaches _____Pneumonia _____Kidney or Bladder problems

_____STD _____Stroke _____Stomach Problems

_____Thyroid

Explain any of the above or add anything that is not listed above that you have concerns about:

_____

_____

List any allergies or reactions to medications: _____

Social History: _____Children _____Married _____Divorced _____Widow/er

Tobacco Use: _____No _____Yes – How much on daily basis _____

Occupation and work status: _____

Alcohol Use: _____No _____Yes – How much on a daily basis _____

Caffeine: _____No _____Yes – How much on a daily basis _____

Patient Signature: _____

Project Coordinator Signature and Review: _____

Appendix G

Power Point for Shared Medical Appointments

Slide 1 Shared Medical Appointments

- Gina Moore CNS, FNP-BC, CDE
- Valparaiso University

Slide 2 What is Diabetes?

- A disease resulting in high blood sugar
    1. Defects in insulin production
    2. Defects in insulin action
    3. Or a combination of both

Slide 3 Diabetes Mellitus

- 25.8 million in US (8-9% of population)
- Consists of 3 types:
    1) Type I diabetes
    2) Type II diabetes
    3) Gestational diabetes (pregnancy)

American Diabetes Association. Retrieved from http://www.diabetes.org/diabetes-basics/diagnosis.

Slide 4 Type 2 Diabetes

- Pancreas “Poops” out
- Blood glucose levels rise due to:
    Insulin resistance
    Insufficient insulin production
- Eventually leads to β-cell failure (Pancreas stops working)
- > 90% of diabetics are in this group

American Diabetes Association. Retrieved from http://www.diabetes.org/diabetes-basics/diagnosis.

Slide 5 Signs of Diabetes

- Thirst
- Increase urination
- Hunger and fatigue
- Weight loss or weight gain
- Blurred vision
- Numbness feet and hands
- Increase infections and slow healing wounds
- Nausea and vomiting and stomach pains

Slide 6 Complications of Diabetes

1. Cardio-vascular disease
2. Heart disease or stroke
3. Kidney disease or failure
4. Eye disease or blindness
5. Nerve damage

Slide 7 Macro-vascular Disease

- Atherosclerosis
- Heart attack or stroke
- Cholesterol or triglyceride problems
- 82,000 heart disease deaths/year
- Diabetics are 2 to 4 times greater risk

American Diabetes Association. Retrieved from http://www.diabetes.org/diabetes-basics/diagnosis.

Slide 8 Kidney Disease

- 14- 25% of all people with diabetes develop kidney disease
- Diabetic nephropathy is the most common cause of end-stage kidney disease and failure which leads to renal dialysis.

Slide 9 Retinopathy

- 14,000 to 28,000 people lose their sight each year because of diabetes.
- Diabetes is the leading cause of new blindness in people 20-74 years of age.

Slide 10 Neuropathy

- 60-70% of diabetics develop some form of nerve damage.
- Nerve damage –hands and feet may hurt, tingle or feel numb, this can lead to loss of a foot or leg due to amputation.
- Slow healing wounds

Slide 11 How do we diagnose diabetes?

- Fasting blood sugar test
- Oral Glucose Tolerance Test
- Glycolated hemoglobin tests or known as hemoglobin A1C

Slide 12 Fasting Plasma Glucose (Blood Sugar)

- Fasting blood sugar (FBS)
- Cheap, fast, finger stick
- <100 -Normal
- 100-126 -Pre-diabetes
- >127 -Diabetes

American Diabetes Association. Retrieved from http://www.diabetes.org/diabetes-basics/diagnosis.

Slide 13 What is a hemoglobin A1C level?

- 3- Month marker on diabetes control
- Non-diabetic patient 4.0-6.0%
- Goals: ADA <6.5 AACE <6.5

Average HGB A1C	Est. Average BG
6%	126
7%	154
8%	183
9%	212
10%	240
11%	269
12%	298

American Diabetes Association. Retrieved from http://www.diabetes.org/diabetes-basics/diagnosis.

Slide 14 What dose diabetes affect?

- Your pancreas
- Your liver
- Your stomach and intestines
- Your heart
- Your kidneys
- Your blood vessels
- Every cell in your body
- Your entire body can be affected

Slide 15 Aggressive treatment in diabetes includes

- Lifestyle changes and nutritional planning
- Exercise and weight loss
- Blood pressure control
- Cholesterol and triglyceride control
- Close monitoring of blood sugars
- Stop Smoking (430,000 people die from use of tobacco every year.

U.S. Department of Health and Human Services. (2012). Retrieved from Diabetes public health resource: http://www.cdc.gov/diabetes/pubs/factsheet11.htm

Slide 16 Exercise is the 1st step in improving your health

- Recommendations:

- Duration---30-45 minutes
- Frequency---5 times per weak
- Intensity---moderate to brisk walk or the feeling of working somewhat hard.
- Dancer, S., & Courtney, M. (2010). Improving diabetes patient outcomes:

Framing research into the chronic care model. *Journal of the American Academy of Nurse Practitioners, 22*, 580-585.

Slide 17 Diabetes – Oral Medications

- Sulfonylureas
- Biguanides
- Thiazolidinedione's TZD
- Alpha-glycosidase inhibitors
- Meglitinides
- Incretin Drugs
  - DPP4 Inhibitors,
  - GLP-1, Byetta and Victoza

Slide 18 Diabetes – Insulin

- Rapid Insulin, Humalog, Novolog and Apidra
- *Regular Insulin (not used as much)*
- *Combination Rapid and Intermediate*
  - *Humalog 75/25*
  - *Novolog 70/30*
- *Long acting Insulin or Basal Insulin,*
  - *Lantus*
  - *Levemir*

Slide 19 <u>Diabetes – Insulin</u>

Insulin	Onset	Peak	Duration
Rapid Insulin	<15 min	1.2-1 hour	3-5 hours
Regular Insulin	30-60 min	1-2 hours	5-8 hours
Combination	<15 min	60 min	Up to 12 hour
Basal Insulin	1 hour		12-24 hours

Slide 20 Aggressive Treatment in Diabetes is Key

- Make lifestyle changes
  - Exercise
  - Learn about what foods make your diabetes better or worse.
  - Learn as much about your diabetes as you can and take control of your life
- <u>Questions?</u>