

Using Nurse Practitioner Coordinated Group Visits to Improve

Diabetes Outcomes in a Primary Care Practice

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Abstract

The purpose of this evidence-based project was to introduce a group visit model as a feasible intervention to improve diabetes outcomes. This quantitative quasi-experimental study looked at a convenience sample of five patients from a population of over 700 diabetes patients in a family practice setting. The group visit intervention was an extended diabetes visit for study participants that includes a focus on electronic health record concordance with the American Diabetes Association guidelines, provider visit and group setting educational and support atmosphere instead of a usual care visit. The outcomes measured were electronic health record concordance with American Diabetes Association guidelines, which improved significantly after the group visit intervention. In addition, diabetic measures outcomes including Hemoglobin A1c, lipids, microalbumin, blood pressure, weight, vaccinations, eye and foot exam, glucose self-monitoring, exercise and smoking status, were measured but results were inconclusive. Improvement in comprehensive care of the diabetic patient population has been shown to decrease diabetes complications, disability, costs and mortality. The study was shown to be feasible within a family practice clinic and could impact over 700 patients in the future. The small sample size limited any generalizable conclusions from the study.

Keywords: diabetes, group visits, outcomes, quality, self-efficac

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Diabetes is a leading cause of morbidity and mortality in the United States (U.S.) with one and a half million new cases in people over 18 every year (Center for Disease Control, 2014). The American Diabetes Association (ADA) reports that this expensive, debilitating, life threatening disease is increasing in numbers at epidemic proportions (2013). Locally, over 700 patients with diabetes were cared for at a local family practice clinic (personal communication, March, 15, 2015). No comprehensive diabetes care system was present at this facility and no outcomes measures reports for diabetes clients. Recommendations from the National Quality Forum (NQF) (2012) recommend comprehensive systems of care management with outcomes to guide intervention at the local level to address this problem. The group visit model for comprehensive diabetes care and education is an innovative way to address this growing problem in a diabetes population (Bray, Roupe, Young & Harrell, 2008). Weinger (2003) defines group visits for diabetic patients as regular visits with the same provider and the same group of patients, that allow for focus on diabetic standards, enhanced education and support over time (see Appendix B for definition of terms).

Significance

Diabetes is an epidemic causing physical, emotional, and financial costs. (ADA, 2013). The World Health Organization (WHO) (2014) reports diabetes estimates reached nine percent of the population causing one point five million deaths worldwide. Countries with low income had the lowest prevalence of diabetes while upper middle class countries have the highest (WHO, 2014). The Centers for Disease Control (CDC) (2014) reports diabetes in the U.S. reached only slightly higher than global estimates at nine point three percent of the population

and 29.1 million cases. Of that total 21 million patients were actually diagnosed with diabetes, 8.1 million had not been diagnosed (CDC, 2014). Diabetes is the seventh leading cause of death in the U.S. (CDC, 2014). The ADA (2013) estimates this growing problem will lead to a prevalence of one in three adults by 2050. Diabetes affects minorities more than Caucasians in the U.S. with non-Hispanic whites affected (7.6%), Asian Americans (9.0%), Hispanics (12.8%), African Americans (13.2%) and Native Americans (15.9%) (CDC, 2014).

A comprehensive evaluation of the economic implications of diabetes in the U.S. was compiled by the ADA (2013) and found the overall cost of diabetes in 2012 was \$245 billion, reflecting that one in five U.S. dollars for healthcare expenditures is on diabetes. Direct costs of diabetes were estimated at \$176 billion (ADA, 2013) while indirect costs topped 69 billion (CDC, 2014). Diabetes costs by lost productivity impact workforce economics by one point seven trillion dollars (Smith, 2009). Absenteeism is greater in diabetes and attributed to one to seven percent of missed work days, contributing to indirect cost of five billion annually (ADA, 2013). Presenteeism is a term describing lost productivity at work and is 30% of the indirect cost total at \$69 billion (ADA, 2013).

Important policy issues in Nebraska include legislation affecting vulnerable populations such as the uninsured. This is the third year that the Medicaid expansion bill has been introduced in the Nebraska Unicameral, Adopt the Medicaid Redesign Act LB 472 (2014-2015) would allow for expanded coverage of Medicaid allowing for federal money to expand health insurance coverage for thousands of Nebraskans. In 2015, Eliminate Integrated Practice Agreements and Provide for Transition-to-Practice Agreements for Nurse Practitioners LB107 (2014-2015) was passed and signed into law. This important step for patients in Nebraska removes barriers to care and makes it easier for nurse practitioners to serve their communities.

Diabetes is a high priority chronic health condition for healthcare reform today (U.S. Department of Health and Human Services (DHHS) *Healthy People 2020*; Institutes of Medicine, 2001; Patient Protection and Affordable Care Act, 2010). The National Quality Forum (NQF, 2012) recommend comprehensive systems of care management with outcomes to guide intervention at the local level to address this problem. Locally the Nebraska Diabetes Prevention and Control Program is an outline for change in Nebraska and surrounding communities. This set of goals and guidelines are an important tool for community health programs at the local level (Nebraska Department of Health and Human services, 2015). Locally, BryanHealth Medical Center and Catholic Health Initiatives hospitals have comprehensive diabetes education and support programs in Lincoln, that are available to patients with insurance. BryanHealth recently added a satellite clinic to the Fallbrook Health Center building, once a week with a Certified Diabetes Educator (CDE) for diabetes education. These services require a prescription and are billed through insurance. It requires planning and scheduling ahead of the visit.

Local Issues

The data reflect that Nebraska's diabetes rates in 2010 were seven point one percent of the population, with five point four percent told they had prediabetes (CDC, 2012). The literature clearly supports that preventive care practices decrease diabetes complications and are essential for cost savings and positive outcomes (CDC, 2012). In Nebraska, those diabetics 18 years and older from 2009-2010 reported an annual eye exam (65.1%), annual foot exam (74.5%), annual flu shot (64%), HemoglobinA1c (HgA1c) checked twice in one year (74.3%), daily self-monitoring of glucose (65%), and ever attending a diabetes self-management seminar at 62.7% (CDC, 2012). The evidence-based study took place in Lancaster county, and those estimates for

number of persons with diagnosed diabetes in 2012 were 15,870 and this number continues to grow as prediabetes patients become diabetic (CDC, 2014).

Within the local family practice clinic over 700 patients have diabetes and currently 633 patients met inclusion criteria for the project. There were no master outcomes report available within the clinic to measure diabetic outcomes, ADA adherence or other factors. The electronic health record (EHR) provided the capability for constructing these reports but required more education of the staff to update all the appropriate fields to draw these numbers. The usual care of diabetes patients was a one-on-one care with the provider, then referrals for diabetes education outside the clinic system. Often patients did not follow up with the formal education program as prescribed.

Diversity Considerations

The ADA (2015) recommends diabetes care that is patient-centered with a focus on cultural barriers. The study site is not an underserved area and there is not a high ethnic diversity level. Rough estimates calculate racial and ethnic numbers at approximately 85% Caucasian, five percent Asian, five percent African American, five percent Hispanic (personal communication, March 1, 2015). There were no hired translators at the office available, so a translation service via the telephone was used in cases where this is needed. If patient agreed to go for formal teaching through one of the two hospital systems, translation services were available. Diabetes literature was available in English and Spanish.

Diversity in other areas was present in the population. The clinic served a family practice population with ages ranging from newborn to the elderly. This population has a diversity of incomes from relatively poor and not insured to higher income and commercially insured. The primary population of insurers were Medicare, Medicaid, PPO Blue Shield, United Health Care,

Tricare (personal communication, March 1, 2015). There was diversity in education levels from adult patients that have not graduated from high school to professionals with post-doctoral level degrees. Educational level, readability, language and cultural considerations are important aspects in culturally competent care (United States Department of Health and Human Services Office of Minority Health, 2000). For study purposes non English speaking patients were excluded from the study.

Problem

The problem within the family practice clinic was no formal comprehensive diabetes care program, no formal outcome management system, and no current ability to measure and review outcomes in the diabetic population. The patient population of over 700 diabetic patients requires a comprehensive chronic health condition management system.

Purpose

Innovative ways to improve diabetes outcomes are being sought (DHHS, *Healthy People* 2020; IOM, 2001, NQF, 2012). The purpose of the study was to introduce a group visit model for adult diabetes care and education into an urban family practice clinic to determine if this model improves medical record concordance with ADA guidelines. An additional intention is to assess improvement in diabetic measure outcomes for patients.

Facilitators and Barriers

Facilitators to the project were buy-in by the owners, providers and staff. This group of stakeholders were committed to improving outcomes of diabetic patients and they were eager to help in new ways. One contributor was a staff member that is a Physician's Assistant. At her previous position in a hospital-based clinic, group visits for diabetes were implemented.

Additionally, there was a CDE already available for this study and she was familiar with the

clinic and the patients. The clinic already has a reminder program in place for appointments and this system was used to alert study participants of visit times.

Barriers to this project were attendance of the participants and attrition, coming to this study takes time out of the patient's day and this was not feasible for some of them. Other challenges were the costs to perform the project which included refreshments, gratitude gift cards and printing costs for take-home educational materials. Organizing this project within the current structure of visits was also a challenge (see Appendix E, Logic Model for DNP diagram).

Review of the Evidence

PICOT

Does adding a group visit intervention for adults ages 18-75 with diabetes at the family practice clinic improve diabetic standard adherence and improve diabetic measures such as HgA1c, lipid control, microalbumin, blood pressure, weight, vaccinations, foot and eye exams, glucose monitoring, exercise and smoking status?

P: adult patients 18-75 with diabetes.

I: group visit model for diabetes focused visits.

C: previous measure comparison

O: chart concordance improvement in the group visits population and diabetic measure improvement in HgA1c, lipid control, microalbumin, blood pressure, weight, vaccinations, foot and eye exams, glucose monitoring, exercise and smoking status in the group visit population.

T: once monthly visits over a 3 month period of time.

Literature Search Strategies

In an effort to review the literature regarding group visits as an intervention to improve diabetic outcomes, a search strategy was implemented. The electronic databases used were PubMed, Medline and Cumulative Index to Nursing and Allied Health and Literature (CINAHL). The keywords used were diabetes and group visits. The search was limited to articles of the English language, adults ages 18-75 from years 2005 to 2015 in each database. The initial search yielded 2177 articles. The search was narrowed by removing doctoral thesis studies and modifying the terms adding the term outcomes. This yielded 73 articles more closely suited to the clinical question, then from those 73 articles 19 articles were chosen for the formal synthesis. These studies were chosen to equally represent group visits overall as well as the sub-topic of diverse populations within the group visit literature. The types of study designs are as follows; seven systematic reviews with meta-analysis, level I evidence, three randomized control trials, level I evidence, three quasi-experimental design, level IV evidence, five qualitative design, level V evidence, one feasibility study, level VI evidence and two evidenced-based guidelines, level VII evidence (Melnyk & Fineout-Overholt, 2005).

Synthesis of Evidence

Studies regarding the group visit format for education and healthcare delivery among adult diabetic patients have been reviewed and synthesized. The design, elements, concepts and processes of the topic was examined through the quantitative and qualitative literature. Group visits have multiple components, for purposes of the review they will be broken down by theme. The matrix method was used to compile an evidence table (see Appendix C for Evidence Table).

Group visits allow for concordance with ADA guideline completion.

There are limited studies specific only to guideline concordance. Clancy, Huang, Okonofua, Yeager & Magruder (2007) study focused only on group visits as it affected concordance with ten ADA guidelines including: HgA1c, lipid and microalbumin completion, ACE inhibitor use, statin use, daily aspirin use, foot and eye exams and vaccinations. This randomized control trial showed 76% of those in the group visit arm had nearly complete charts (9/10 indicators complete), compared to 23% of the control group. Higher rates of completed charts by the ADA guidelines were found in Bray et al (2005) study of 314 patients, with visits led by an Advanced Practice Nurse Practitioner. Siminerio, Piatt & Zgibor (2005) studied habits of six healthcare providers with group visits and found improvement in ADA guideline compliance. Simmons & Kapustin's (2011) systematic review found only two studies, Clancy et al (2007) and Bray et al (2005) studies focus on guideline concordance, finding improved outcomes with group visits.

Disease measure improvement can be affected by the group visit model.

There is strong evidence that group visit interventions improve HgA1c levels. Two large systematic reviews of over 39 randomized control studies found a mean difference of -0.46 in HgA1c level between group visit and usual care groups (Housden, Wong & Dawes, 2013; Sumego & Bronson, 2014). Quinones et al. (2014) study found short and long term glycemic control over time, while an insulin dependent only study of 239 patients also showed lower HgA1c -1.0% with CI of 95% with group visit participants (Crowley, Melnyk, Coffman, Jeffreys & Edelman, 2013). Another systematic review by Burke & O'Grady (2012) reviewing nine studies revealed HgA1c improvement. Improvement in HgA1c had some dependence on attendance frequency in two studies, the more often the participants came the more improved the HgA1c became (Clancy et al., 2007; Guirguis et al., 2013). Smaller studies such as Jessee &

Rutledge (2012) and Riley's (2012) studies found HgA1c improvement as well. However, Dinneen et al. (2013) found no difference between group visit and usual care in an Irish study of 437 adults, the author concluded that since positive patient feedback occurred, the group visit model was still a good choice for health care delivery.

There are mixed data related to other diabetic measures and the group visit framework. Hypertension control data are often collected in these studies, as blood pressure control is an important marker to meet for diabetics (ADA, 2015). Burke & O'Grady (2012) study found improvement in their systematic review of nine studies showing improved blood pressure control in the group visit arms. Improvement (-16.7) of systolic blood pressure was noted in the Simmons & Kapustin review (2011). In addition, significant changes in blood pressure were found in some studies and not in others (Brennan, Wong & Phelps, 2010). Dyslipidemia was not consistently improved with the group visit model (Brennen et al., 2010; Burke & O'Grady, 2012), some studies showed no change or mild improvement (Dontje & Forrest, 2011; Riley, 2012). Immunization rates improve with group visits (Brennan et al., 2011; Clancy et al., 2007) influenza and pneumococcal vaccinations were most commonly measured. Obesity, Body Mass Index (BMI) changes or weight loss is sometimes addressed in the studies, and can be achieved through the group visit intervention (Brennan et al., 2011) but the data are limited on this topic.

Group visits promote education and self-care.

The consensus among the studies is that group visits at the least review with patients basic diabetes education (ADA, 2015) nutrition guidelines, glucose self-monitoring habits, exercise, foot care, medication education and adherence with medical management. Vachon et al. (2007) incorporates other supportive additions such as cooking classes and yoga/meditation. The group concept can influence participants by social persuasion and peer modeling to improve self-care

behaviors (Jaber et al., 2006). Using the group visit model versus usual care, outcomes such as self-efficacy scores improve (Crowley et al., 2013) and overall knowledge about diabetes improves (Simmons & Kapustin, 2011). Siminerio et al. (2005) study found 67.3% baseline diabetes knowledge on the Diabetes Knowledge Test tool, and after the intervention the average score was 78%, $p=.003$. This study also measured diabetes empowerment pre and post group visit intervention and found mild improvement that was not statistically significant (Siminerio et al., 2005). Bray et al. (2005) found a change from zero percent willingness to perform diabetes self-care to 42% willingness after the group visit intervention.

Theory

Self-determination theory (SDT) was used to guide the project of adding group visits to a family practice. This theory contends that autonomous motivation contributes to the lasting changes in behaviors needed in chronic illness and diabetes (Deci & Ryan, 2008). Promotion of autonomous motivation is an important intervention to encourage self-efficacy, thus improving outcomes (Williams et al., 2009; Zoffman & Lauritzen, 2006). Even though this was not specifically a change theory, it was well suited to guide this project.

Concepts that are critical to the project were motivation and self-efficacy. Motivation related to health behavior is a concept that describes the self-determined internal assessment of health related decisions (McEwen & Wills, 2007). This concept was important as it relates to a patient's ability to make behavior changes that are necessary for diabetes self-care (Shigaki et al., 2010). Higher levels of motivation are associated with improved diabetes self-care among patients (Shigaki et al., 2010). Motivation can be differentiated between intrinsic or autonomously driven versus external or controlled (Deci & Ryan, 2008). The literature supports that the autonomous motivation led to more self-efficacy than the controlled, however both

forms can lead to more goal-directed behavior (Deci & Ryan, 2008). Zoffman & Lauritzen (2006) report intrinsic motivation for self-management improves glycemic control.

Self-efficacy can be defined as the way a person feels about himself or herself in the context of completing a task or accomplishing a goal (Zulkosky, 2009). Related concepts to self-efficacy are self-confidence and self-esteem, these concepts imply a more global feeling about oneself, while self-efficacy is more about a goal and achieving an aim (Zulkosky, 2009). Sousa & Zauszniewski (2005) report “diabetes knowledge contributes to the enhancement of self-efficacy” (p. 63). Rosenstock (1985) and Johnson (1996) recommended self-efficacy enhancement designs should be standard in all diabetic education programs. Bandura (1997) believed that modeling and observational learning was most effective in behavior change. Thus, one could hypothesize the group visit model could not only educate but externally motivate participants in the group (Deci & Ryan, 2008) (see Appendix D for Theory to Application diagram).

The evidence based practice model that best fits this study is the Iowa Model. The Iowa Model format involves a problem focused trigger and in this case this is the suboptimal diabetes control. This issue is an organizational priority due to the problem statement. The next step in the model is to form a team and synthesize the evidence which is part of the current project. Finally the Iowa model contends evaluation and then dissemination (Krom, Batten & Bautista, 2010; Titler et al., 2001).

Methods

IRB Approval, Site Approval, Ethical Issues, Funding

Approval for the study was received July 17, 2015 from UMKC (See Appendix K

Proposal Approval Letter). The primary IRB for the project was through the University of Missouri Kansas City (UMKC), approval was received July 28, 2015 (See Appendix L, IRB approval letter). The current study site did not have an IRB. The clinic owners verbally agreed to proceed with the study, and the clinic manager signed the approval letter and contract.

The major research ethical concerns for this study were protection of privacy, confidentiality, student investigator research conflicts, conflicts of interest and vulnerable population protection. The patients that participated in the group visit format may have disclosed personal information to others in the group setting. In previous studies the group members were asked to keep what was spoken of in the group private and sign a do not disclose document (Barud, Marcy, Armor, Chonlahan & Beach, 2006). The participants were informed ahead of time that the group visit format included the possible risk of personal disclosure from other group members. The medical record information was kept private and confidential. To avoid obligation bias, the student investigator did not recruit personally for the study. The CDE was paid by a pharmaceutical company to offer non-branded education to the patients. This was disclosed during the study. There was care to exclude vulnerable populations in the study such as patients that were intellectually disabled, severely mentally ill or pregnant.

The cost of this project was \$2870.00. Funding for this project was obtained from a \$1000.00 grant from the UMKC Graduate Women's Fund. The clinic owners waived the overhead costs for the program, the CDE volunteered her time for education. Some fees were recouped by office visit charges (see Appendix A, Cost Table).

Setting and Participants

Data was collected at the family practice clinic. This independently owned family practice clinic was in an urban setting in the northwest outskirts of Lincoln, Nebraska. It was large enough to accommodate groups of people in its conference room and break room, and has individual private rooms for exams as well.

The inclusion criteria for participants of the study was that they were active patients with insurance at the family practice clinic, ages 18-75 with type 1 or type 2 diabetes with the ability to read and write English at a fifth grade level. This was a convenience sample of all patients that met criteria and agreed to participate. Exclusion criteria was vulnerable populations such as patients with intellectual disabilities, patients with a diagnosis of moderate to severe mental illness or pregnant women. Exclusion criteria included non-English speaking patients, deaf patients and patients without insurance. Potential patients that met criteria were 663.

Recruitment was posted in the office, information on the family practice clinic website, as well as other medical staff and other providers invited patients to participate. To avoid obligation bias this author did not recruit patients directly.

EBP Intervention

The intervention for this study was adding a group visit model for diabetes education to a shortened usual care visit (See Appendix J for Intervention Implementation Plan Flow Diagram). This model involved a group of patients with diabetes that came to their clinic for care; it included a short one-on-one visit with their provider, prior to the visit the charts of these patients are reviewed for completeness according to diabetes guidelines (ADA, 2014), any gaps in vaccinations, labs or vision and eye testing was recorded and completed (Housden et al., 2013). The patient then joined a group led by a healthcare provider that can be a certified diabetic

educator nurse practitioner, physician's assistant or physician (Jessee & Rutledge, 2012). The education content follows evidence-based guidelines (ADA, 2014; Handelsman et al., 2011). These visits had two or three hours reserved for total time (Brennan et al., 2011). Group visits were offered regularly over time, monthly or quarterly over time (Housden et al., 2013).

The patients gave verbal consent to participate over the phone, those that did had a chart review the day before the group visit intervention. Charts were reviewed for completeness in meeting ADA guidelines such as documentation of HgA1c, lipid control, microalbumin, blood pressure, weight, vaccinations, foot and eye exams, glucose monitoring, exercise and smoking status. Deficiencies were flagged to be completed at the visit. The medical assistant helped with this review, and the healthcare provider signed off on those reviews.

The check-in component of the intervention took approximately ten minutes per patient. Once the patients arrived, the informed consent was reviewed with them by the investigator and they signed it. The medical assistant then begin completing deficiencies, drawing needed lab, reviewing medications and recording any new complaints related to diabetes. The medical assistant had the patients remove their shoes and socks. The private individual provider visit element took approximately ten minutes per patient or less, occurring right after each check in for efficiency. This short visit included review of the chart with the patient, medication review, and a brief exam with a foot inspection. The HgA1c was not available immediately but it was reviewed at the exit procedure if due.

The group visit section took 60 minutes to complete. When the patient had completed the provider visit they were escorted to the meeting room and sat with the group and the CDE leader of the group. The support piece started immediately, once all the members arrived and the support was completed then the group leader added the education piece. All patients received a

folder of ADA approved handouts with different topics each visit (ADA, 2014) (see Appendix F for Intervention Materials). The topic changed each month and was tailored to the needs of the group that was present. During that time any needed lab was collected, a written plan for change or instruction was prepared for each patient by the provider and the medical assistant.

The exit procedure took five minutes per patient. The provider reviewed with each patient briefly the HgA1c result (if drawn), the plan and if further specific visits were needed (such as if insulin needed to be added, or other big changes that required more time). Diabetes education materials were sent with the patient. The patient's were encouraged to return monthly to the meetings (see Appendix G for Intervention Plan Flow Diagram)

Change Process

To promote change in the diabetic population the group visit intervention was aligned with the Self-Determination Theory allowing autonomy support garnered by the group visit. This leads to more internal positive feedback about the diabetes and enhances autonomous self-regulation (Deci & Ryan, 2008). As the patient perceives more competence in their diabetes care, seeing the improved glycemic control and enhanced understanding this leads to improved adherence and further self-efficacy (Williams et al, 2009). The evidence-based practice model that best fits this study is the Iowa Model with the problem focused trigger being suboptimal diabetes control. This organizational priority led to a plan and completion of this project. Then the Iowa Model suggests evaluation and dissemination (Krom, Batten & Bautista, 2010; Titler et al., 2001).

Study design

The study was a quantitative quasi-experimental design, because it used a convenience sample and did not randomize participants. The design was chosen because blinding would be

difficult with this sort of study and participant count was low. The type of study allowed for a pretest and posttest outcome evaluation for chart concordance and diabetes outcomes.

Validity

The study had limited validity due to the small sample size. Internal validity threats were other possible explanations for improved HgA1c such as extraneous factors, history, outside support, outside education. External validity was impacted by small number of participants, demographics, as the clinic sees a small number of minority patients and this affects generalizability of results. Certainly the convenience sample affected the external validity because those patients that agreed to the study may already be more motivated to control their diabetes than those who did not agree to the study.

Outcomes

The primary outcome of the study was improved medical record concordance with ADA guidelines including eleven factors; HgA1c every 6 months, lipids once a year, microalbumin urine once a year, blood pressure with visits, weight with visits, smoking status, vaccination status, eye and foot exam, glucose monitoring status and exercise status, after the group visit intervention with significant improvement of $p=0.038$ after the intervention. The second primary outcomes were improved measures of diabetes indicators including HgA1c change, lipids change, microalbumin change, blood pressure change, weight change, smoking status change, vaccination completion rate change, eye and foot exam completion change, self-glucose monitoring change, and exercise with inconclusive change after the group visit intervention.

Measurement Instruments

The measurement instrument was individual chart reviews by the student investigator, this data was kept on a spread sheet then compared to the same data after the intervention in the

analysis. Speaking to validity and reliability information, all patients had the same electronic medical record and data for this information and it was found in the same place in chart. The data collected was quantitative. Study participants did not complete an instrument (see Appendix H for Data Collection Template).

Quality of Data

Methods to assure adequacy of the data included a power analysis that estimated approximately 60 participants to establish quality. Baseline data was retrieved from the EHR which was a secured system and the same system was used for post intervention data retrieval. The investigator was trained to gather data in a systematic manner, it was recorded in the same sequence on the same document. Close collaboration with statistician Dr. An-Lin Cheng was used to enhance the quality of the analysis.

Analysis Plan

The plan for data analysis initially included the individual t-test for continuous variables and Chi-square analysis for binary data. After consultation with the statistician an adjustment to the analysis was made for quality and accuracy. Due to the small sample size nonparametric testing was used, two-related samples test and Wilcoxon for continuous variables and McNemar testing for binary data was employed.

Results

Setting and Participants

The group visit intervention was implemented at Fallbrook Family Health Center in Lincoln Nebraska, once monthly from October 20, 2015, through December 8th, 2015. Five patients of the clinic completed the study. Three subjects attended all three group visits and two subjects attended two group visits. All five subjects were Caucasian, with insurance coverage.

Three subjects were women and two were men with an age range of 53-74, and an average age of 60.8 years. Three subjects required insulin to treat their diabetes and two subjects did not, all five patients had type 2 diabetes.

Intervention Course

The group visit intervention began October 20th, 2015 at 230pm and three subjects came to this visit. The remaining two subjects came to visits two and three. The participants checked in at the front desk then were brought to a private exam room for a short intake and physical exam. The charts for these patients was reviewed ahead of time for deficiencies in the ADA standards. Each patient was examined privately and any missing lab, vaccines, foot exams or other data were updated. Patients were then given a folder with diabetic education topics and a name tag. They were taken to a conference room and joined the group one by one until all three or five participants were present. This group was led by a CDE, and healthy snacks (fresh vegetables and dip, crackers and cheese, water) were provided. The CDE led the group through the handouts, facilitated discussion and support. While this was happening the nurse practitioner was updating the charts and making an exit form with each patient's current data for their information. The total visit lasted approximately two hours from start to finish. At the conclusion of the intervention the subjects were given thank you notes with a \$10 gift card to local grocery store and an invitation to return the next month.

Outcome Data by Subtopic

The first outcome was chart completeness as defined by eleven factors recommended by the ADA. Initially the average number of complete factors was 6.2/11, or 56% completeness. After the conclusion of the group visits there was a rate of 100% completion of these factors which is an improvement of 44%. Due to the small sample size, nonparametric testing was

employed using two-related samples test and Wilcoxon for continuous variables and McNemar testing for binary data (see Appendix I for Statistical Analysis tables). The results for chart concordance were significant $p= 0.038$ indicating there was a significant increase in chart concordance from pretest.

The second outcome was eleven diabetic factors such as HgA1c change, lipids change, microalbumin change, blood pressure change, weight change, smoking status change, vaccination completion rate change, eye and foot exam completion change, self-glucose monitoring change, and exercise change. The results of these factors were mixed and p values were all > 0.05 . The average A1c reading was 6.94% prior to the intervention and 7.58% after the intervention. Two subjects had improvement in A1c readings and three subjects had worsening A1c readings after the last group visit. Cholesterol panels were evaluated with some participants levels improving and others worsening. Microalbumin assessment was based on whether this value was obtained and not on whether the microalbumin result changes because of the short duration of this study. Three subjects did not have a current microalbumin at the start of the study, but all of the subjects had a completed microalbumin by the end of the study. Systolic blood pressure was used to measure change in blood pressure. The average systolic blood pressure was 129.6 prior to the group visit and 114.8 after the group visit, which is a 14.8 point decrease in blood pressure. The average weight prior to the intervention was 233.6 pounds, and after the intervention was 234.8 which reflects a 1.2 pound gain. Vaccination completeness was 80% prior to the group visit and 100% after the group visit. Eye exams in the last year were complete 80% of the time prior to the intervention and 100% of the time after the intervention. Foot exams were complete 40% of the time prior to the intervention and 100% of the time after the intervention. Glucose self-monitoring frequency increased slightly from 80% of participants

checking as prescribed to 100% after the group visit. Exercise frequency was only slightly changed with one participant increasing frequency from occasional to daily after the group visit. Overall 40% of the participants exercised and 60% did not. None of the participants were smokers and all charts were complete with this recording. There was no missing data (see Appendix M for Outcomes Results Table).

Discussion

Successes

The study was a success on different levels. Most importantly there was feasibility of the group visit model in the existing family practice clinic. This lays the groundwork for a larger and longer study. The staff and patients responded well to the format. The study site worked well to handle the participants. Although significant improvement ($p= 0.038$) in the first outcome of chart concordance was found which is encouraging, the sample size is too small to draw a conclusion from.

Study Strengths

The study experience was positive for subjects and staff. The subjects were flexible, and enthusiastic about the study. Their enthusiasm grew as they came to more meetings. They had positive feedback all the way through and they would express this with reminder calls and at other office visits. The flow of the visit was different than the usual care but the staff, patients and researcher did adapt and found that it was not difficult to adjust to this new paradigm. The clinic space was conducive to group visits with an adequately sized conference room for privacy. The office manager was thankful that attention was being given to chart concordance as she is in charge of meaningful use reporting. The owners of the clinic were happy to have attention given to quality improvement in this population.

Results Compared to the Evidence in the Literature

The results were consistent with the literature, as noted prior the chart concordance was found in the literature to improve with group visits (Clancy et al, 2007; Simmons & Kapustin, 2011). Dependent on the number of participants and length of the study diabetic outcomes can improve with longer studies generally being necessary to see significant changes (Crowley et al, 2013). The findings from this study were limited and show some improvement and some worsening control but no significant differences.

Limitations

Internal validity effects

The largest internal validity effect is the small sample size. The study lacks the power to develop robust conclusions. Internal validity can also be affected by confounding variables outside of the study. In this study one of the participants was having some nausea from her new GLP-1 medication and this side effect could have affected resulting weight, blood pressure and A1c measurement. She did get good support from the CDE for this side effect and changed her diet to avoid food with the administration of the medication improving her symptoms. The timing of the study, over winter months and the holiday season could have negatively affected weight and glucose control versus a study done in the spring or summer.

External validity effects

The external validity is certainly affected by the convenience sample and small sample size of five participants. This low number affects the ability to generalize any of the outcomes. The ethnic makeup and age of the participants is also a factor that could affect results and ability to conclude all groups would have the same results. The setting, a family practice clinic with mostly middle income insured patients, could lend itself to outcomes that may not be applicable

to other socioeconomic classes. In addition the short duration of the study decreases overall validity.

Sustainability of effects and plans to maintain effects

The group visit model was well received and the plan is for the clinic to continue to offer this option for diabetes care on a quarterly basis. The clinic owners are open to continued support of this project, and the CDE continues to be available for education. As for the ability for these diabetes patients to maintain any progress they have made that will be difficult to know, and most studies reflect in any chronic illness lasting changes in behavior are a challenge (Brennan, 2010).

Efforts to minimize study limitations

In an effort to avoid bias this student investigator did not recruit patients directly and this could have affected the sample size. Overall validity would have improved had the sample size been larger. Validity would be improved had the study been longer term over a variety of seasons. Validity would have improved if the ages, ethnic makeup of the population were more diverse.

Interpretation

Expected and actual outcomes

The improvement in ADA chart concordance was consistent with the literature and was expected, especially since part of the group visit intervention is a thorough chart review for deficits prior to the group visit. The inconclusive results from the diabetic factors was consistent with the literature and also expected accounting for this short period of time and confounding variables.

Intervention effectiveness

Efficacy can be measured many ways, however for the purposes of this project there was some noted efficacy in the chart concordance improvement and mixed diabetic factor results. The chart concordance was inferred to be affected directly by the required thorough chart reviews prior to visits. Qualitative data was not used for this project, however there was strong positive feedback from the subjects after the interventions were completed, and the hope the patients could continue this type of visit in the future. The literature is strong on the positive qualitative outcomes a group visit model can have (Brennan et al, 2011; Dinneen et al, 2013).

Intervention revision

Future ideas for improving this study would include a larger sample size, this could be achieved with mailings, personal recommendations from healthcare provider, emails and other contacts. Also adding other providers for the education component such as the nurse practitioner, physician, pharmacist, physical therapist, or dietician would be helpful. Adding qualitative measures in the future would allow for a more comprehensive research project.

Expected and actual impact to health system, costs and policy

The impact of study on the larger health system is insignificant, however the study does confirm the feasibility of an evidence-based care models that could touch over 700 diabetic patients in the Fallbrook clinic in the future. Prevention of diabetic complications saves money in decreased health care visits, hospitalization, dialysis, surgeries, productivity, disability and quality of life (ADA 2013). All of these factors add up to the billions of dollars spent on diabetes in the U.S. yearly (ADA, 2013). This research adds to the knowledge base for health system changes by examining alternative models of care to help chronic illness patients.

Costs associated with the study ended up being less due to the smaller than expected participant size. The estimated cost was \$2870.00 which included all costs necessary for the study apart from lab testing. Because the office allowed for in-kind costs, rent, salaries, and the CDE was paid by a pharmaceutical company, the remaining costs were only for paper copies and folders, thank you cards, name tags, gift cards and snacks at the meetings. The actual total was closer to \$1200.00. The study was funded by the clinic with in-kind costs, and the UMKC Graduate Women's Fund award of \$1000.00. Future funding will come from the family practice clinic, however this intervention does pay for itself if at least seven patients attend.

Conclusions

Practical Usefulness of Intervention

The intervention is a useful tool in a comprehensive diabetes program. It was shown to be feasible to implement, it provided added support for patients and it helped to add more attention to diabetic markers over time. Having an option to use group visits for patients that desire the group visit's cohesive long term support, camaraderie, additional education is a plus. Not all patients will want or need this model but many patients could benefit.

It is important to have a complete chart for improved diabetes outcomes. The complete chart adds to quality, safety and ultimately cost efficacy (IOM, 2001). Meaningful use requirements for optimal reimbursement rely on a completed chart and the evidence supports that group visits can add to chart completeness (Blumenthal & Tavenner, 2010).

Further Study of Intervention

Overall, the group visit model for care of the diabetic patient shows promise as an innovative way to help a growing group of patients with chronic illness. This is a complex process to achieve improved outcomes for a complex disease, thus the study of the group visit

could be broken down in many ways to get more specific data on each subtopic. The evidence is growing in this field but lacks consistency and strength, with most thought leaders recommending more study in this domain. Recommended study avenues include more investigation on the financial impacts of group visits, outcome improvement, satisfaction, diversity considerations across groups and longer duration of study. This researcher intends to continue group visits and measure outcomes that are quantitative and qualitative in nature. The evidence is growing and group visits are more prevalent in the literature since the project began in 2013. Diabetes research is a very important focus for quality improvement today and in the future.

Dissemination

This study was presented by a research poster presentation March 19, 2016 in Milwaukee, Wisconsin at the Midwest Nursing Research Symposiums' annual conference. This researcher also disseminated results at the current practice site among staff and providers, and data was shared at the Lincoln Nurse Practitioner Journal Club and PEO (a local women's organization) meeting.

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Appendix A

Group Visit Budget Table

Indirect costs:		Direct costs:	
Rent	\$200 x 3 600.00	Front desk staff	\$99.00
Utilities	included	Medical Assistant	\$103.50
Educational Handouts	.03 x 500 x3 15.00	Certified Diabetic Educator	\$ 378.00
Statistical analysis	1000.00	Nurse Practitioner	\$ 675.00
Total:	1615.00	Total:	\$ 1255.00

Total costs: \$ 2870.00 3 months.

Appendix B

Definition of terms

BMI Body Mass Index is a measure of body fat based on height and weight of a person used to assess health risk

Diabetes a condition referring to Type 1 and Type 2 Diabetes Mellitus, this is a complex health condition that generally speaking causes too much glucose or sugar in the blood.

Group visits a model of health education, support and disease management where a group of patients with the same medical condition meet over time to improve health related outcomes.

GSM glucose self-monitoring, referring to patients testing their blood glucose.

HemoglobinA1c a lab test used to measure average blood sugar over three months time.

Macrovascular complications secondary disease processes that affect large vessels such as coronary artery disease, cerebrovascular disease, peripheral vascular disease.

Microalbumin a urine test that can show early microscopic proteinuria an indicator for early kidney damage often associated with diabetes or hypertension.

Microvascular complications secondary disease processes that affect the small vessels such as retinopathy (eyes), neuropathy (feet), nephropathy(kidneys).

Appendix C

Author, date title	Purpose	Research Design¹, Evidence Level² & Variables	Evidence Sample & Sampling, Setting	Table Measures & Reliability (if reported)	Results & Analysis Used	Limitations & Usefulness
<p>Sumego & Bronson (2014). Review: In Type1/2 Diabetes, group medical visits improve HbA1c levels compared with usual care.</p> <p>Quinones(2014) Educational group visits for the management of chronic health conditions: a systemic review</p>	<p>Study whether group visits improve bio-physical and patient reported outcomes compared usual.</p> <p>GV model effect on quality of life, function, self-efficacy, utilization and biophysical outcomes</p>	<p>Meta-analysis Level I</p> <p>Systematic review and meta-analysis Level I</p>	<p>26 studies met criteria</p> <p>14 studies</p>	<p>Quality of life assessment tool Diabetic measures</p> <p>Glycemic control, quality of life, function, self efficacy measures</p>	<p>HgA1c levels improved. No other consistent differences.</p> <p>Short and long term glycemic control improvement. Moderate improvement in self-efficacy in diabetes. No consistent improvement in function or quality of life.</p>	<p>Larger studies over longer duration needed. Innovation needed in complex medical care. Benefits of GV may not be as easy to quantify but may exist.</p> <p>Group visits look to be helpful for diabetes and may be helpful for other chronic illnesses. More study should be done.</p>
<p>Housden, Wong, & Dawes (2013). Effectiveness of group medical visits for improving diabetes care.</p>	<p>Evaluation of effectiveness of group visits for diabetes</p>	<p>Systematic Review and Meta-analysis Level I</p>	<p>13 studies met criteria</p>	<p>Outcome measures reviewed. Risk of bias assessment done on studies</p>	<p>Significant HgA1c reductions. Improved quality of life scores. General improved diabetes self care.</p>	<p>Few long-term studies, only published studies used. Studies are on specific populations. Wider use of this model will have a</p>

					Meta-regression analysis	positive impact on patient outcomes
Crowley (2013) Impact of baseline insulin regimen on glycemic response to a group medical clinic intervention	Explore which patients benefit most from GV, study impact of insulin use on GV response	Randomized control trial Level I	239 patients , veterans, randomized to treatment or usual care group.	Linear mixed models, significance levels.	GV group lowered A1c. No difference in self-efficacy. No difference in hypoglycemia.	Veteran mostly male population, may not be generalizable. Sample size. Useful specific study about insulin use patients.
Dinneen (2013) group f/u compared to individual clinic visit after structure ed. For type 1 DM	Compare outcomes from individual vs. group f/u education	Cluster, RCT Level I	437 adults Type 1 DM Ireland clinics	Linear mixed models.	No difference in A1c. Improved quality of life, depression, anxiety, severe hypoglycemia and hospital attendance.	Good sample size. Group as effective as individual visits, important cost and time savings.
Riley (2012) Improving diabetes outcomes by an innovative group visit model: A pilot study	Development of a group visit model that improves outcomes	Feasibility pilot study (qualitative) Level III	n=22 non-randomized. Adults diabetics A1c>7.5% No minorities	Pre/post test descriptive design A1c, Wt. BP Depression and satisfaction quest.	Paired t-tests, improved A1c, Wt. BP, depression and satisfaction scores	Small sample, nonrandomized, no minorities. Short duration. Good outcomes, productivity and billing information.
Burke & O'Grady (2012) GV hold great potential for improving diabetes care and outcomes, but best practices but be developed.	Review literature on group visits and group self management education for diabetics	Systematic review and meta-analysis, evaluation of terms and elements of GV. Level 1	9 studies	Meta-analysis of outcomes. General review of format, terms, payment.	Improved Hga1c & blood pressure . Inconclusive lipid control, decreased hospital visits and thus costs. Cross cultural benefits are suggested.	Consistency in billing practices. Difficulty studying GV due to varied definitions. More study recommended.

Dontje (2011) Implementing group visits: Are they effective to improve diabetes self management outcomes?	Examine whether group visits improve self care in diabetic patients	Qualitative design Level III	Adult diabetics A1c >8% 51 patients, Academic health center. Monthly visits optional for 33 months.	Patient and provider satisfaction tools, ADA guidelines, A1c, microalbumin, BP, LDL, Eye and foot exam, vaccinations, tobacco use, meds	Some mildly improved ADA guidelines. Significantly high ratings on satisfaction both patients and providers	Not RCT, small sample, High satisfaction among patients and providers is important.
Simmons & Kapustin (2011). Diabetes group visits: An alternative to managing chronic disease outcomes	Review of studies that looked at group visits as way to improve diabetic outcomes	Systematic review RCT Level I	9 studies met criteria	AHRQ rating given to each study and limitations discussed.	Improved satisfaction, financial and patient outcomes.	Lack of "standard" of a group visit for equal comparison. More study needed.
Brennan (2010) Group visits and chronic disease management in adults: A review	Review evidence on group visits	Systematic review, RCT Level I	24 studies	Level of evidence rated, outcomes	Improved standards of care, quality of life, satisfaction of patients and physicians, lower acute care utilization, reduced costs.	Inconsistent outcomes BMI, A1c, BP and lipids. Overall recommendation as a good model to address chronic health issues.
Bray (2008) Feasibility of system redesign for diabetes care.	Evaluate restructured care for minorities in rural care with diabetes	Feasibility study Qualitative Level II	n=314 adults with type 2 DM.	Diabetic outcomes, productivity outcomes, documentation completeness	Improved documentation, productivity and billable encounters	Successful implementation with positive outcomes for patients and clinic.
Clancy (2007)	Evaluate the effect of GV on				6month no difference in	Small sample size, Difficult to measure direct effects of ed.

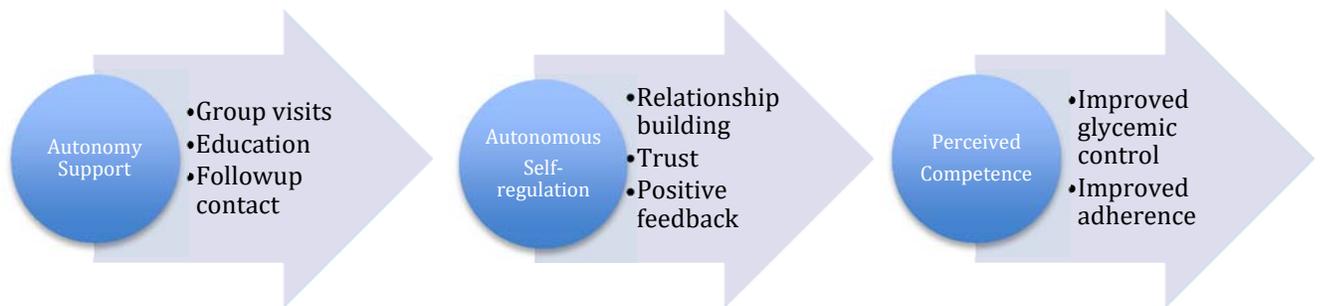
Group visits: promoting adherence to diabetic guidelines	outcomes, ADA guidelines	RCT Level I	12 month RCT, 189 diabetics, usual care. 6 and 12 month eval. Mostly minority, Underinsured.	Cross-sectional analysis, t-test, Fisher's exact test, Wilcoxon rank sum test,	groups. 12 m significant difference ADA concordance and breast and cervix screening	Improved guideline concordance in high risk
Jaber (2006) Group Visits: A Qualitative review of current research	Review of group visit qualitative studies	Systematic review, Qualitative data Level III	18 articles reviewed	Patient satisfaction, Health service utilization, quality of care, self-care, quality of life, disease outcomes, physician satisfaction, cost of care.	Outcomes classified by significant vs. insignificant outcomes.	Interpretation of studies difficult. Standardization of the group visit model would make study easier. GV promising, more study needed.
Barud(2006) Development and implementation of group medical visits at a family medicine center	Define group visits, discuss process, billing and experiences	Retrospective qualitative design Level III	50 patients University of OK Family Medicine clinic.	Descriptive	Attendance rates 40-60% Satisfaction surveys overall positive.	Anecdotal information without outcomes reports. Helpful systems examples.
Diverse populations						
Homa (2013) Diabetes Specialty Clinic: An intervention to improve care for Veterans	Effort to improve glucose control but supporting Veterans and motivate self-care	Qualitative design Level III	Veterans with A1c <9% n=39	Serial A1cs recorded 4 questionnaires. PHQ-9 SF-12 PAID SDSCA	Improved A1c by 1% from baseline. Improved satisfaction scores	Small sample size. Nonrandomized. Confirmation and social desirability bias Financial sustainability as this program requires grants in the fed system. Positive feedback from Veterans.
Guirguis (2013) Improving diabetic control using	Assess effectiveness in specific population	Quasi-experimental	Veterans n=60 West Haven Ct.	A1c recorded 6-12 wks and 1 yr.	Post hoc analysis A1c improved if patients	

shared medical appointments		Level II	VA Med Ctr.		returned for visits.	Not RCT, small sample. As above.
Jessee & Rutledge (2012). Effectiveness of nurse practitioner coordinated group visits for type 2 diabetes in medically underserved Appalachia	Study effect of group visits on specific population	Quasi-experimental design. Level II Variables usual care vs. group visit	21 years or older n=11 intervention group n=15 control group Non randomized Convenience sample.	Healthcare barrier survey, Demographic questionnaire, Pre and post knowledge on self efficacy and diabetes knowledge	Improved HgA1c, increased knowledge and self-efficacy compared to usual care group. Barriers to care; fuel, time, family, work and transportation.	Small study, convenience sample, nonrandomized. Specific population. Tool for use of the group visit in medically underserved areas.
Vachon (2007) Improving access to diabetes care in an inner-city, community-based outpatient health center with a monthly open-access multi-station group visit program Siminerio (2005) Implementing the chronic care model for improved diabetes care. ADA (2015)	Explore program development and implementation for inner-city healthcare system improve access and empower diabetic patients to self-care Pilot study, use of the CCM for diabetes, rural outcomes	Qualitative design, Level III	Convenience sample, n=294 85% African American 6% Hispanic 1% Asian 1% White 4% unknown Convenience sample n=17 6 healthcare providers	Measures, attendance, demographics analysis, Satisfaction concluded from repeat attendance BDC, DES, DRT,	Chi-square analyses Independent t-test SAS analysis Increased access to care, McNemar's paired t-test, ada guideline	Not an outcomes study, nonrandomized. Helpful to have an intervention that is innovative, low cost. Convenience sample, small size, positive influences

<p>Standards of medical care diabetes</p> <p>Haas (2014) National standards for diabetes self Care management education and support</p>	<p>EBP Practice guidelines</p> <p>EBP practice guidelines</p>	<p>Quasi-experimental level II</p> <p>Level 5</p> <p>Level 5</p>		<p>DSMP, attitude scale, HgA1c, Lipids, BP ht/wt.</p>	<p>improved, knowledge gained, empowered A1c HDL+</p> <p>Program standards</p> <p>Program standards explained</p>	<p>Extremely broad, all diabetes care</p> <p>Standard structure: internal, external, program coordination, instructional staff, curriculum, individualization, ongoing support, progress, QI</p>
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Appendix D

Theory to Application Diagram



Self-determination Theory Applied to Group Visit Project. Adapted from “Reducing the health risks of diabetes how self-determination theory may help improve medication adherence and quality of life,” by G. Williams, H. Patrick, C. Niemiec, L. Williams, G. Divine, J. Lafata, ... M. Pladevall, 2009, *The Diabetes Educator*, 35(3), p. 490.

Appendix E

Logic Model

Inputs	Intervention(s)		Outcomes		
	<i>Activities</i>	<i>Participation</i>	<i>Short</i>	<i>Medium</i>	<i>Long</i>
<p>Evidence, sub-topics Group visits for diabetes improve outcomes in many studies Different measures Satisfaction Productivity Cultural considerations</p> <p>Major Facilitators or Contributors Facility buy-in Supportive staff, CDE Reminders for patients</p> <p>Major Barriers or Challenges Attendance Cost to facilitate Organizational</p>	<p>The EBP intervention which is supported by the evidence in the Input column Monthly group visits for study participants</p> <p>Major steps of the intervention Interview patient and review of chart for gaps. Fill in the gaps with appropriate lab, vaccines, etc.. Brief physical exam. Educational piece in a group format with CDE or health professional educator. Closing recommendations from health care provider.</p>	<p>The participants (subjects) Adult patients with diabetes mellitus. Site Fallbrook Family Health Center, Lincoln, NE Time Frame 6 months Consent Needed or other Verbal consent from owners has been given, will need written consent Person(s) collecting data Amy K. Arndt Brenda Post Medical Assistant Others directly involved. Physicians, Nurse Practitioners and Physicians Assistant at the office to help recruit for study CDE, or educator Statistician</p>	<p>(Completed as a student). Outcome(s) to be measured with reliable measurement tool(s)</p> <p>ADA guidelines concordance in the charts of diabetic patients.</p> <p>Change in HgA1c, BP, Weight, Lipids, exercise frequency, smoking status, glucose monitoring</p> <p>Statistical analysis to be used. Chi-square T-test</p>	<p>Outcomes to be measured (past DNP student time). Electronic medical record completeness for ADA guidelines. Change in HgA1c, Blood pressure, weight, lipids, exercise, smoking status, glucose monitoring.</p> <p>Could add eye exams, foot exams, vaccinations.</p>	<p>Outcomes that are potentials (past DNP student) Demographics Satisfaction</p>

Rev. 7/09, 1/2015
http://www.uwex.edu/ces/lmcourse/interface/coop_M1_Overview.htm
 Logic-Model Worksheet content revisions by Lyla Lindholm, Applied to DNP EBP Project. Not to be placed on web for public use. For UMKC DNP coursework only.

Appendix F

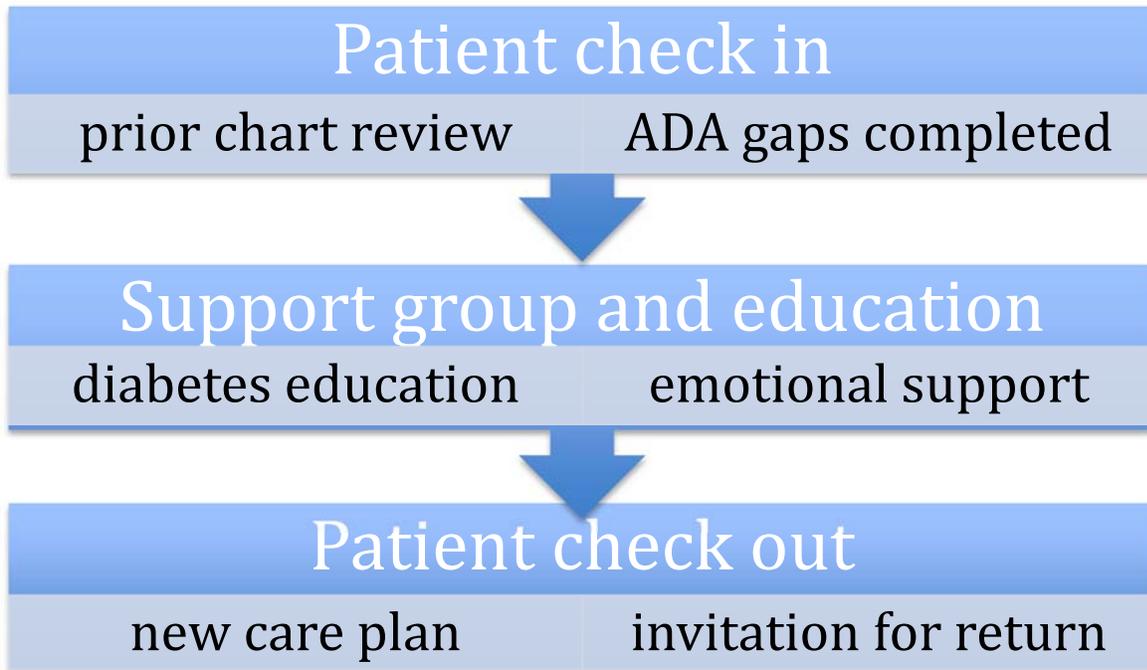
Intervention Materials

The certified diabetic educator (CDE) will use skills as an educator to facilitate a support group atmosphere. Then the CDE will use non-branded, approved handouts and teaching tools from the ADA website (ADA, 2014). The following documents will be included,

Type 1 Diabetes, Type 2 Diabetes, Diabetes Diagnosis, Factors Affecting Blood Glucose, Medications for Treating Type 2 Diabetes, Taking Care of Your Feet, A1c, Diabetes and Oral Health, Skin Care and Infections, Diabetes Medical Alert Card, Fast Food Facts, Be More Active, Healthy Food Swaps, Food Labels, Best Foods For You, Diabetes and Stress, Diabetes and Your Eyes, Protect your Heart, Carb Counting, Quitting Smoking, Diabetes and Kidney disease, Nerve damage and diabetes, Hypoglycemia, Standards of Care.

Appendix G

Intervention Plan Flow Diagram



Appendix H

Data Collection Template

Patient 1

Gender

Age

Race

Pre Intervention

Post Intervention

ADA Chart Concordance (x/11)

Hemoglobin A1c

Lipids

Microalbumin

Blood pressure

Weight

Vaccinations

Eye exam

Foot exam

Glucose self-monitoring

Exercise

Smoking status

Appendix I

Statistical Analysis Tables

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Chart Completeness After - Chart Completeness Before	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	5 ^b	3.00	15.00
	Ties	0 ^c		
	Total	5		
Group Visit 3 A1c - Group Visit 1 A1c	Negative Ranks	2 ^d	1.75	3.50
	Positive Ranks	3 ^e	3.83	11.50
	Ties	0 ^f		
	Total	5		
Group Visit 3 Systolic BP - Group Visit 1 Systolic BP	Negative Ranks	4 ^g	2.50	10.00
	Positive Ranks	0 ^h	.00	.00
	Ties	1 ⁱ		
	Total	5		
Group Visit 3 Weight - Group Visit 1 Weight	Negative Ranks	2 ^j	2.75	5.50
	Positive Ranks	3 ^k	3.17	9.50
	Ties	0 ^l		
	Total	5		
Group Visit 3 Vaccine completeness - Group Visit 1 Vaccine completeness	Negative Ranks	1 ^m	1.00	1.00
	Positive Ranks	0 ⁿ	.00	.00
	Ties	4 ^o		
	Total	5		

Test Statistics^a

	Chart Completeness After - Chart Completeness Before	Group Visit 3 A1c - Group Visit 1 A1c	Group Visit 3 Systolic BP - Group Visit 1 Systolic BP	Group Visit 3 Weight - Group Visit 1 Weight	Group Visit 3 Vaccine completeness - Group Visit 1 Vaccine completeness
Z	-2.070 ^b	-1.084 ^b	-1.826 ^c	-.542 ^b	-1.000 ^c
Asymp. Sig. (2-tailed)	.038	.279	.068	.588	.317

Wilcoxon Signed Ranks Test

		Ranks		
		N	Mean Rank	Sum of Ranks
Group Visit 3 Total Cholesterol - Group Visit 1 Total Cholesterol	Negative Ranks	3 ^a	2.67	8.00
	Positive Ranks	2 ^b	3.50	7.00
	Ties	0 ^c		
	Total	5		
Group Visit 3 HDL - Group Visit 1 HDL	Negative Ranks	5 ^d	3.00	15.00
	Positive Ranks	0 ^e	.00	.00
	Ties	0 ^f		
	Total	5		
Group Visit 3 Triglycerides - Group Visit 1 Triglycerides	Negative Ranks	1 ^g	1.00	1.00
	Positive Ranks	4 ^h	3.50	14.00
	Ties	0 ⁱ		
	Total	5		
Group Visit 3 LDL - Group Visit 1 LDL	Negative Ranks	3 ^j	3.67	11.00
	Positive Ranks	2 ^k	2.00	4.00
	Ties	0 ^l		
	Total	5		
Group Visit 3 nonHDL - Group Visit 1 nonHDL	Negative Ranks	3 ^m	2.00	6.00
	Positive Ranks	2 ⁿ	4.50	9.00
	Ties	0 ^o		
	Total	5		

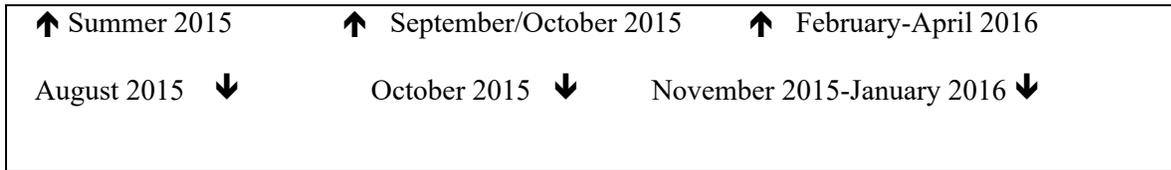
Test Statistics^a

	Group Visit 3 Total Cholesterol - Group Visit 1 Total Cholesterol	Group Visit 3 HDL - Group Visit 1 HDL	Group Visit 3 Triglycerides - Group Visit 1 Triglycerides	Double-click to activate Group Visit 3 LDL - Group Visit 1 LDL	Group Visit 3 nonHDL - Group Visit 1 nonHDL
Z	-.135 ^b	-2.032 ^b	-1.753 ^c	-.948 ^b	-.405 ^c
Asymp. Sig. (2-tailed)	.893	.042	.080	.343	.686

Appendix J

Intervention Implementation Plan Flow Diagram

Site approval owners	Post study offering	Collect post intervention data
CDE agreement	Recruit patients	Synthesize data
MA agreement		



IRB approval	Collect pre intervention data	Begin monthly group visits
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Appendix K

Proposal Acceptance Letter



July 17, 2015

Dr. Mary O'Connor
Members of the Social Science Institutional Review Board
University of Missouri-Kansas City
Kansas City, MO 64108

Dr. O'Connor;
This letter serves to provide documentation regarding Amy Arndt Doctor of Nursing Practice (DNP) project proposal. Ms. Arndt obtained approval for her project proposal, Using Nurse Practitioner Coordinated Group Visits to Improve Diabetes Outcomes in a Primary Care Practice, from the School of Nursing DNP faculty committee on July 17, 2015.

If I can provide any further information, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Susan J. Kimble".

Susan J. Kimble, DNP, RN, ANP-BC
Clinical Associate Professor
MSN and DNP Programs Director
UMKC School of Nursing and Health Studies
kimbles@umkc.edu
816-235-5962

Appendix L
IRB Approval Letter



Principal Investigator: Renee Endicott PO Box 92 □ Harrisonville, Missouri 64701

Protocol Number: 15-341 □ Protocol Title: Using Nurse Practitioner Coordinated Group Visits to Improve Diabetes Outcomes in a Primary Care Practice Type of Review: Designated Review

Date of Approval: 07/28/2015 Date of Expiration: 07/27/2016

Dear Ms. Endicott,

NOTICE OF NEW APPROVAL

The above referenced study, and your participation as a principal investigator, was reviewed and approved, under the applicable IRB regulations at 21 CFR 50 and 56 (FDA) or 45 CFR 46 (OHRP), by the UMKC IRB. You are granted permission to conduct your study as described in your application.

This approval includes the following documents:

Attachments

Recruitment_Script_Dated_6-30-15 □ Data Collection Tool-2 □ Educational_Session_Outline
Site_Approval_Document_Dated_6-30-15 15-341_Adult_Consent_Form_Version1_Dated_6-30-
15_Stamped Methods_Section_DNP_Project_Dated_6-30-15 Recruitment_Poster_Dated_6-30-15

Privacy_Documents_6-30-15 Screening document

If a consent is being used in this research study you may find the stamped version in section 16 of your application.

The ability to conduct this study will expire on or before 07/27/2016 unless a request for continuing review is received and approved. If you intend to continue conduct of this study, it is your responsibility to provide a Continuing Review form prior to the expiration of approval.

This approval is issued under the University of Missouri - Kansas City's Federal Wide Assurance FWA00005427 with the Office for Human Research Protections (OHRP). If you have any questions regarding your obligations under the Board's Assurance, please do not hesitate to contact us.

There are 5 stipulations of approval: □1) No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date. (PIs and sponsors are responsible for initiating Continuing Review proceedings). □2) All unanticipated or serious adverse events must be reported to the IRB. □3) All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk. This includes any change of investigator. 4) All protocol deviations must be reported to the IRB. □5) All recruitment materials and methods must be approved by the IRB prior to being used.

Please contact the Research Compliance Office (email: umkcirb@umkc.edu; phone: (816)235-5927) if you have questions or require further information.

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UMKC 5319 Rockhill Road Kansas City Missouri TEL: 816 235-5927 FAX: 816 235-5602



Thank you,

Simon MacNeill UMKC IRB

UMKC 5319 Rockhill Road Kansas City Missouri TEL: 816 235-5927 FAX: 816 235-5602

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Appendix M

Outcome results tables

