BRIEF REPORT

Improving diabetes outcomes by an innovative group visit model: A pilot study

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Abstract

Purpose: To develop a group visit model that improves A1C, blood pressure, lipids, depression, and satisfaction among patients with diabetes that can be used in primary care practice settings.

Data sources: Using a pre/post-test descriptive design, data were collected from 22 adult patients of a private family practice office. All patients had a diagnosis of diabetes and A1C of 7.5 or above. The participants consisted of over 70% of persons aged 50 or older who reported having diabetes for over 5 years. Eighty percent were female and 32% were African American. A1C, blood pressure, weight, lipids, depression, and satisfaction surveys were measured before and after the group visit series.

Conclusions: The mean reduction in A1C was 1.1 points ($p = .009$). Weight decreased by a mean of 3.01 pounds ($p = .001$), diastolic blood pressure improved by a mean of 5.76 mmHg ($p = .002$). The Beck Depression Inventory showed significant improvement ($p = .045$) in depression scores. The Seattle Outpatient Satisfaction Questionnaire showed improvement ($p = .028$).

Implications for practice: This model of care needs further testing, but preliminary data show it to be effective in improving clinical outcomes of patients with diabetes and realistic for nurse practitioner's to implement.

Diabetes is a chronic disease of epidemic proportions affecting 10% of the population and 23% of those over 60 years in the United States alone (Stobbe, 2010). The newest estimates from the Centers for Disease Control and Prevention (CDC) show that if current trends continue, the United States can expect one in three Americans to have diabetes by 2050 (Stobbe, 2010). With the staggering increase in the prevalence of diabetes much research has been directed toward finding new and improved models for the delivery of health care to patients with diabetes. Thus far most of this research has been done in large academic, veterans, or health maintenance organizational settings, yet much diabetes care in the United States is still managed in smaller private primary care settings (Riley & Marshall, 2010). "Primary care medical practices are increasingly confronted with requests from payers, employers, and government monitoring agencies to report quality data" (Sloane et al., 2011, p. 369) Diabetes has frequently been the chronic disease model used in these quality data reports.

One model proposed to improve outcomes in persons with diabetes that has gained increased momentum over the past few years is diabetes-focused group visits. Group visits, sometimes referred to as shared medical appointments (SMAs), are organized in many different ways, and no one best model has been demonstrated in the literature (Riley & Marshall, 2010). In all existing published models, the group visit incorporates some form of group patient education along with some assessment and medical management as is traditionally done in individual office visits. These group visits last from 60 to 240 min, and patients, in groups ranging from 4 to 20, are seen together for instructional discussions related to diabetes self-care followed by individual assessment and medication/treatment management by a healthcare provider (physician, family nurse practitioner [FNP], clinical pharmacist, or physician assistant). The healthcare provider assessment/management is sometimes done in the group setting or in an adjacent private examining room, and most providers bill for this visit using the established

patient reimbursement levels 3 or 4 patient office visit (CPT 99213 or 99214) depending on the level and complexity of the visit (Shahady, 2010a).

Despite the goal of The American Academy of Family Physicians (AAFP) to incorporate at least one group visit per month by end of 2010, most family practices have yet to incorporate group visits. Experts postulate that fear of facilitating the group process may hinder some providers from establishing group visits (Shahady, 2010b), while other studies suggest time and cost to be possible obstacles to the initiation of group visits in private practices (Edelman et al., 2010). The purpose of this pilot study was to develop a group visit model that both improves the important clinical outcomes (A1C, blood pressure, lipids, depression, and satisfaction) of patients with diabetes and can be readily implemented in most primary care practice settings.

Study design

A practice-based small research study was developed to test the feasibility of SMAs in a small, private practice setting. This pilot study used a pre/post-test design and was conducted in a semirural southern town in a small private family practice using existing staff. The final convenience sample included 22 patients participating in SMAs with meetings every month for three meetings. Outcomes of A1C; blood pressure; lipids; weight; depression, using the Beck Depression Inventory (BDI); and satisfaction, using the Seattle Outpatient Satisfaction Questionnaire (SOSQ) were analyzed in a pre/post-test design. While the idea of SMAs for persons with diabetes is not new, the use of an interactive white board to address diabetes self-management and the cost-effective model of using just one FNP and one medical assistant (MA) to complete the group visit has not been addressed in the current literature.

Theoretical foundation

The "Stages of Change Theory" was the theoretical foundation for this research study (Jones et al., 2003). Programs that first assess the patients' specific needs by identification of barriers and deficits and then go on to assess the stages of change of the target population have been more successful in achieving glycemic control (Osborn & Fisher, 2008). Diabetes self-management programs grounded in health behavior change theories have also been shown to be more likely to change behavior when the patient is in the precontemplation, contemplation, or preparation stages of change (Osborn & Fisher, 2008). This study assessed patient readiness to change by use of a stages of change questionnaire (Figure 1) ad-

ministered both at the start of the program and at the conclusion.

Practice description

The setting was a private, four-provider (two family physicians and two NPs) family practice in a town with approximately 29,000 persons located in a rural region of a southern state. The nearest endocrinologist and diabetes self-management program was located 60 miles away. The FNP researcher was also a certified diabetes educator (CDE).

Patient selection

Inclusion criteria for study entry included current patients of the practice with diagnosis of type 1 or 2 diabetes whose most recent A1C value of record was 7.5% or greater. Studies have shown that 50%–80% of people with both type 1 and 2 diabetes have significant knowledge and skill deficits and mean A1C levels are unacceptably high both in both groups (Norris et al., 2002). While the pathophysiolgy differs between type 1 and type 2 diabetes, patients have similar needs in the area of self-management (Briggs & Gemmell, 2007). Only adult (18 and older), nonpregnant, English speaking patients were invited to participate. This family practice had a population of over 900 active patients with the diagnosis of diabetes (seen within the past 2 years) at the time of recruitment. Laboratory records of A1C values done over the past year were assessed to identify the potential pool of patients; 118 patients met the study criteria. A convenience sample of 30 patients was recruited from the 118 eligible patients; the sample size was limited to 30 patients to examine the feasibility of this model of care in this practice setting and because there was no external funding to support additional staff.

All potential patients ($n = 118$) were sent a letter with a stamped return envelope inviting them to the study. In addition, the researcher or one of the practice staff called patients in alphabetical order to personally invite them to participate in the study. After 30 patients signed the informed consent, the process of recruitment was ended.

Over the next 2 weeks, the 30 patients were divided into three groups based on both patient selection of time schedules and demographic profiles of the patient (i.e., the researcher tried to place male patients in a group with at least one other male patient). Times for sessions were set to have one morning group, one afternoon group, and one evening group with 10 participants in each group. Once the groups began, eight of the patients who signed the consent forms postponed participation for a

Stages of Change Question

Name_____   Study number_____

Date_____

For most people, changing long-held habits is hard to do. Just think of the people you know who have tried to quit smoking, cut down on drinking, or lose weight. When you have diabetes, it is important to develop healthy eating and exercise habits that can help you keep your blood sugar within a healthy range. According to the Centers for Disease Control and Prevention (CDC), people go through 5 stages when modifying their lifestyle habits:

When it comes to learning healthy habits to manage your diabetes, which stage are you in (check one)?

○1. **Non-awareness**—You haven't even thought about changing your habits.
○2. **Realization**—You've realized that there may be benefits to changing your habits.
○3. **Ready**—You're ready for action.
○4. **Action**—You take steps to change your behaviors.
○5. **Maintenance**—You work toward maintaining your accomplishments.

Figure 1 Stages of change question.

variety of reasons, leaving a final sample size of 22 active participants.

Patient demographics

The final sample of participants consisted of over 70% of persons aged 50 or older who reported having diabetes for over 5 years. All but one participant had type 2 diabetes, which is similar to the national incidence rate of type 2 diabetes (American Diabetes Association [ADA], 2011). Four out of five patients were female and one out of three was African American. The demographic distribution of race was similar to the demographics of the community for Caucasians and African Americans, but underrepresented Hispanic and Asians. Significantly more females (81.2%) than males (18.8%) chose to participate in the SMAs. Fifteen of the 22 patients (68%) who participated in the study were existing patients of the FNP/CDE researcher; the remaining seven (32%) were patients of the family practice physicians associated with the practice.

Methodology

The Institutional Review Board of the associated university reviewed and approved the study and the patient consent form prior to patient recruitment. All patients gave written informed consent. Prior to preparation of the curriculum and formation of the group visits, a focus group of eight representative patients was done to elicit their ideas about the organization and content of the group visits. The responses from the focus group were used to guide the topics for the curriculum and to organize the groups. Three of the eight focus group pa-

tients participated in this study sample. Two of these patients attended the afternoon session and one attended the evening session. All participants selected their own groups based on time and personal schedule; visits were facilitated by the researcher who is a CDE and FNP. Group visits were interactive in nature using hands-on activities and interactive white board (SMART™ board) technology. The SMART™ Board allowed the participants to touch and move pictures or words on the screen to "interact" with the material. Direct Internet access is available on the SMART™ Board, which allowed visits to websites such as the American Association of Diabetes Educators (AADE), ADA, National Institutes of Health, and others for quick classroom resources and discussions. Group process techniques facilitated the learning of the participants. Individual patients were assessed and their self-management goals were recorded at each group visit on a form developed by the researcher.

The group visits lasted 2 h, with the first hour spent in interactive focused educational group activities facilitated by the researcher; in the second hour the researcher did individual assessments and medication management in an adjacent examination room. While the researcher was doing the individual assessments, the remaining group members continued to interact with the SMART™ board curriculum with the MA in attendance. An average of 5–7 min was spent with each patient during the individual assessment/management portion of the group visit. The group visit only focused on assessment/management of the patients' diabetes, blood pressure, cholesterol, or coping. If patients had other medical problems (i.e., flu or musculoskeletal symptoms) they were given a traditional individual appointment. The family physician was onsite and worked collaboratively with the researcher to

manage any of the study patients beyond the scope of the NP's practice guidelines. The family physician also reviewed the records of patients managed by the NP in accordance with state laws. The contribution of the family physician was the same level of involvement as traditional individual office visits.

The groups met once a month for three consecutive months. Visit one focused on healthy eating and understanding diabetes. Participants learned the basics of carbohydrate counting, reading labels, food preparation, and portions by the interactive curriculum designed by the researcher for the SMART™ Board. Activities required the patients to go to the SMART™ board and move pictures of food into the correct categories or to pick the correct serving size of an item to "place" on a plate. Visit two focused on exercise and medications and included Internet videos of exercises the patients tried at the visit using resistance bands. Additionally, other interactive activities on the SMART™ board addressed diabetes medications. The third and final visit focused on healthy coping and avoidance of complications. Examples of stress reducing activities were shown using links to videos. Music clips were included that ranged from Chinese meditation to gospel singing to golden oldies about friendship. Patients shared their methods of reducing stress, and the discussion of complications focused on prevention strategies including interactive activities on the SMART™ board with various types of footwear. Monitoring blood sugars and problem solving was interwoven into all three of the interactive lesions. At the end of each visit, each patient was given free handouts and activities available from the various pharmaceutical, medical equipment, and governmental agencies supporting diabetes education. Also, a printed list of the websites used at each visit was made available to each participant to use at home.

All patients had laboratory testing of A1C and low-density lipoprotein (LDL) levels and completed the BDI, the SOSQ, and the Stages of Change questionnaire (Figure 1) within 4 weeks of beginning the first group visit. These same measures were repeated after the three group visits were completed, so that no less than 12 weeks or more than 14 weeks elapsed between the pre- and post-testing. The BDI was used because it is one of the few depression surveys that has actual reliability data in the diabetes population (Lustman, Clouse, Griffen, Carney, & Freedland, 1997). The BDI has a positive predictive value of 71% in the diabetes population (Lustman et al., 1997). The BDI screen was done at the beginning of the study and a protocol for physician or psychological referrals was followed based on the score to assure that patients with significant depression would receive prompt and appropriate treatment. Patient satisfaction was measured by the SOSQ with permission (Fan, Burman,

Table 1 Group visit clinical outcomes, $N = 22$

Measure	Pre	Post	p value (paired t-test)
A1C	9.25	8.17	.009
Diastolic BP	82.81	77.14	.002
Weight	240.00	236.90	.001
LDL	82.60	80.95	.747
Beck	13.77	10.14	. 045
Hum SOSQ[a]	85.89	95.70	.004
Org SOSQ[a]	80.48	88.09	.052
Total SOSQ[a]	86.84	92.26	.028

[a]SOSQ, Seattle Outpatient Satisfaction Questionnaire where higher scores equal more satisfaction.

McDonell, & Fihn, 2005). The SOSQ has been specifically designed and tested for validly and reliability in primary care settings. It is divided into two sections, the "humanistic" scale and the "organizational" scale. Each section is scored separately and then added to obtain a "total" satisfaction score. The humanistic scale measures the interpersonal skills of providers and is comprised of the first 12 items; the organizational scale consists of the last nine items about the general office procedures (Fan et al., 2005). Laboratory testing and vital signs were obtained by the usual staff of the practice and recorded in the electronic medical record (EMR) in the customary fashion. The MA who served as the research assistant for the study then obtained this information from the EMR with a standard data collection form.

Data analysis was done using the Statistical Package for the Social Sciences (SPSS) software to calculate descriptive statistics and outcomes were calculated using paired t-tests.

Results

Eighty-two percent of patients reduced their A1C levels and the mean reduction for the study group was 1.1 points (11.67%; see Table 1). Patients' weight decreased by a mean of 3.01 pounds, and diastolic blood pressure improved by a mean of 5.76 mmHg. Patients' depression scores on the BDI improved significantly ($p = .045$) at the post-testing data point. Patient satisfaction demonstrated an increase on the humanistic scale. These were all statistically significant. The second part of the SOSQ, the organizational scale, showed improvement but not at a statistically significant level. Although 15 of 20 patients (75%) reduced their LDL cholesterol, the reduction did not reach statistical significance. Two patients were excluded in the LDL calculations because their beginning LDL was unobtainable because of high triglyceride level (see Table 1).

Table 2 Group visit evaluation of facilitator. How would you rate the facilitator in the following areas? N = 22

	Excellent	Very good	Good	Fair	Poor
Ability to communicate clearly	95.5%	4.5%	0	0	0
Organization and preparedness	95.5%	4.5%	0	0	0
Ability to hold your interest	91.0%	9%	0	0	0
Handles difficult situations	95.5%	4.5%	0	0	0
Respects patients needs and differences	95.5%	4.5%	0	0	0
Ability to keep session interactive	95.5%	4.5%	0	0	0

Table 3 Evaluation of the group visit. Please rate each of the following aspects of the diabetes group visit, N = 22

	Excellent	Very good	Good	Fair	Poor
Content	95.5%	4.5%	0	0	0
Handouts	81.8%	13.6%	4.5%	0	0
Smart board	63.6%	22.2%	9%	0	0
Interactive activates	68.3%	18.1%	13.6%	0	0
Motivational	77.3%	22.7%	0	0	0
Overall program	86.4%	13.6%	0	0	0

When completing the stages of change questionnaire, no patients in either the pre- or post-testing period indicated they were in stage one or nonawareness stage of change. Ten patients (45.5%) indicated they were in the second or realization stage at the beginning of the study but at the conclusion of the study only one patient (4.5%) continued in this stage. At the conclusion of the study most patients (50%) indicated they were in stage 4 or action phase, which was an increase from 32% at pretesting. Pretesting yielded no patients reporting they were in stage 5 or the maintenance stage but at conclusion of the study 23% patients felt they had progressed to the maintenance stage.

Group visit evaluation results

Ninety-one percent of the participants (20 of 22) attended all three group visit sessions, the remaining 9%, two people, attended two of the three sessions. Having three different sessions improved the attendance. While participants were encouraged to stay in their assigned group as a cohort for social support, when schedule conflicts arose, participants were offered the option of attending a different session.

Ninety-one percent of the participants wanted to continue group visits at the conclusion of the study, and most (61%) wanted the frequency of the visits to remain at once per month. Ninety-five percent (21 of 22) rated the facilitator as excellent in her communication and organization skills. The same number (95%) scored her as excellent in keeping the session interactive, respecting patient needs, and ability to handle difficult situations (Table 2). When asked to rate the group visit on a scale of 1–5, the majority of participants rated the content, handouts, use of SMART™ board, interactive activities, motivational, overall program, and interaction with others with diabetes as excellent (see Table 3).

Cost analysis

While few published studies discuss staff costs and reimbursement, the financial investment of the implementation of SMAs must be taken into consideration to make this model of care become a reality in clinical sites not receiving external funding. Patients participating must be willing and able to pay for an office visit or copay to attend a group visit, and the healthcare provider must be able to maintain a certain level of productivity to justify the time involved in the group visit.

In this study, seven to eight patients attended each group and they were each billed for an established level 4 office visit based on the level and complexity of care provided. While the actual group visit lasted 2 h, the FNP/CDE and one MA were involved with the group visit for a total of $2\frac{1}{2}$ h, including setup and charting. No additional staff were needed. The FNP/CDE typically has 20 min scheduled for chronic care patient follow-up appointments, allowing for an average of three chronic care follow-up visits per hour. Using these parameters, the FNP/CDE was able to bill the usual amount of charges for the time allotted to the group visit, and the MA assigned to this provider is the same as is customary during individual appointments. The original study design called for 10 persons in each group, which would allow the FNP/CDE to be more productive (i.e., to see and bill for more patients per hour) then in the usual individual appointment schedule. This time did not include the preparation time involved in the initial curriculum development.

Conclusions

All participants indicated they were at least at the realization stage of change at the beginning of the study. This is very consistent with other successful behavior change studies. People have to realize that change is necessary before they will be ready for behavior change. Most all participants progressed in their change stages to at least one level higher than at the beginning of the study. Significant improvements were seen in the A1C, blood

pressure, weight, depression, and satisfaction scores of patients participating in this model of SMAs. The improvements demonstrated in this small pilot study are greater than those seen in most existing published studies on group visits (Riley & Marshall, 2010). Most patients enjoyed the group visits and wanted to continue to receive diabetes care using this format. All patients in this study paid the customary charges, copays, and deductibles, but most still expressed an interest in continuing monthly group visits. Once the curriculum is developed, the staff time used in this model is cost-effective and allows for productivity levels that mirror or improve the current individual appointment model in private primary care practices.

Limitations

The small sample size and lack of representation from ethnic groups other than African American and Caucasian limits the ability to generalize to other populations. This is a nonrandomized study, thus it could be argued that the patients agreeing to participate were more motivated to change. Patients whose diabetes is not in optimal control are typically seen every 3 months and this study included monthly provider visits; therefore the positive changes in this pilot may be attributed to simple frequency of visits. The study was of short duration, so it is not known if these improvements will be sustained over time. The majority of the patients were part of the usual panel of the FNP/CDE, who was also the researcher, thus, satisfaction scores might be higher than expected.

Discussion/Implications

Most (68%) of the study patients were existing long-term patients of the FNP/CDE who facilitated the group visits. Despite best efforts, these patients had experienced chronic poor glycemic control, but after just three short months of the interactive group visit these same patients made very significant improvements in their clinical physical and psychological outcomes. The group visits provided a structured way to present diabetes self-care in an interactive manner not usually available during the individual office visit. The patients shared their problem-solving techniques with each other and provided emotional support to one another. More research is needed to discover other reasons these patients were able to have improved outcomes in the group visit over the individual visit with the same provider.

The group visit model used in this study appeared to be more accepted and liked by female than male patients. Of the 22 patients enrolled in the study only four

men agreed to participate, and the two persons who indicated they did not want to continue the group visits were both men. The gender difference may be associated with the fact that male patients have been found to be more reluctant to join support groups (Barnett, 2005), or to visit a healthcare provider for any reason, or perhaps because the group facilitator was a woman. Kjerulff and associates showed that women with chronic illnesses are more likely to get outpatient care compared to men who are more likely to need hospitalization (Kjerulff, Weisman, Frick, Rhoades, & Dyer, 2005). Many of the existing studies on group visits have been done in hospital clinics administered by the U.S. Department of Veterans' Affairs using a predominantly male population of patients, which may account for the lack of robust improvement in clinical findings. Diabetes group visits may need to be organized in a different manner to more optimally address the needs of male patients, similar to how current self-management interventions are modified to address a specific ethnic group.

The facilitator for the group visit, being both an FNP and CDE, had a rather unique combination of certifications that may not be readily available in many primary care settings. It is unknown how her background and educational experience influenced the results. More studies will need to be done using the same curriculum with different healthcare providers as facilitators. A combination of a CDE and a physician, NP, or physician assistant may be used if the combination provider is not readily available (Watts et al., 2009). In this case, the optimal number of participants in the group may need to be increased to keep the model financially self-sustaining. An additional option may be to structure the educational portion of the group visit to follow the National Standards for Diabetes Self-management Education and apply for accreditation through the AADE or recognition through the ADA. The processes of accreditation/recognition provide quality improvement measures and the platform to support reimbursement for the educational component of the group visit (Riley & Marshall, 2010).

NPs are charged with improving patient outcomes and developing practice based research and innovative care models. This model of care needs further testing in larger, longer randomized trials, but preliminary data show it to be effective in improving important clinical outcomes of patients with poorly controlled diabetes as well as financially feasible to implement in private primary care practices.

research committee members B. Parrish medical assistant at Family Health Care Center served as research assistant. The nurses, medical assistants, laboratory, office, administrative, and other staff of FHCC.

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