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Impact of Shared Medical Appointment among Persons with Diabetes

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Abstract

Purpose: To determine the impact of shared medical appointments on diabetes outcomes. In addition, we hoped to identify patient characteristics that may facilitate greater improvement in A1c through management via shared medical appointments by exploring previous mode of diabetes management, mental health utilization, and service connection status.

Methods: The study was a retrospective chart review of electronic health records of patients involved in a diabetes-focused shared medical appointment clinic from July 1, 2011 through December 31, 2015. Diabetes outcome measures (A1c, weight) were collected prior to enrollment in the clinic and up to 3 years after enrollment to determine impact of SMA on disease management. Data regarding service connection status and mental health enrollment was collected as a tool in hopes to characterize the types of patients best benefitting from SMA's.

Results: A total of 71 patients were included in this study. Mean A1c of our study cohort decreased at years 1, 2, and 3 from original A1c at baseline. Weight did not change greatly over the three years. The decrease in A1c from baseline at years 1 and 3 (pvalue = 0.003 and 0.037, respectively) was statistically significant. The other secondary variables studied did not show any correlation.

Conclusions: A shared medical appointment is an effective means to diabetes management, resulting in significant decrease in A1c that persists over time. Certain patients may specifically benefit from management in this way, although the specific characteristics of those individuals have not been identified.

Keywords: Diabetes; Haemoglobin A1c; Disease management; Delivery of care; Decision making; Clinical utility

Introduction

One of the largest health concerns of American people today is the growing prevalence of diabetes. According to the Center for Disease Control, the number of Americans diagnosed with diabetes has increased four-fold from 1980 to 2014 [1]. It is estimated that 30.3 million people in the United States have diabetes, which is over 9% of the population [2]. Diabetes, over time, if not managed appropriately, can lead to macrovascular and microvascular complications including cardiovascular disease, renal failure, amputations, and blindness [2]. People with diabetes have a 50% higher risk of death compared to people without diabetes. Medical costs for people with diabetes are more than twice that of people without diabetes [2]. With such extensive direct and indirect costs, it is critical for healthcare systems to focus on diabetes management among the American population. One particular healthcare system with a greater population of people with diabetes is the Military Health System. Within this population, the prevalence of diagnosed diabetes ranged from 7.3% to 11.2% in 2006 and from 8.3% to 13.6% in 2010 [3]. In 2010, the prevalence among Non-Active military men and women were 15.0% and 13.3% respectively for those aged 45-64 years. The prevalence rises with age with a notable prevalence of 32.9% and 26.9% respectively for those aged 65-74 years and 31.5% and 25.7% respectively for those aged 75 years and older [3]. Continued advances in treatment strategies, both pharmacological and non-pharmacological, provide various approaches towards achieving optimal diabetes control. The American Diabetes Association (ADA) generally recommends a goal haemoglobin A1c (HbA1c) of <7% in effort to reduce the risk of long-term complications [4]. However, despite various treatment options, including many new oral medications and formulations of insulin, only about half of American adults with type 2 diabetes achieve an HbA1c of <7%. According to data from the National Health and Nutrition Examination Surveys (NHANES) through 2010, only 30% of patients on insulin therapy and 50% of those on oral medications are able to reach this goal [5]. Because diabetes management requires a combination of medication as well as lifestyle modifications, including nutrition, physical activity, and weight management, close collaboration with various healthcare professionals is important for individuals affected by diabetes. In recent years, the Shared Medical Appointment (SMA) has become a more widely utilized approach to diabetes management. This unique method employs an interdisciplinary healthcare team, most commonly consisting of a physician, pharmacist, and registered nurse, to facilitate a group ranging from 5 to 25 patients with the same disease state [6]. Each individual is given the opportunity to communicate with providers and other patients about his or her disease management. Often, similar actions are taken to a one-on-one appointment. Most visits last for

about 2 hours and frequency of visits range from as short as every 3 weeks to every 3 months [6].

A randomized controlled trial performed by Edelman et.al. [7] Showed improvement in HbA1c and blood pressure in subjects managed in an SMA versus standard of care. Patients receiving care via SMA met with groups of 7 to 8 other individuals and a care team consisting of a primary care physician, pharmacist, and nurse or other certified diabetes educator. In 6 months, mean HbA1c improved 0.8% in the SMA cohort, as compared to 0.5% in the usual care group. Sadur, et al. [8] evaluated the effectiveness of a cluster visit, similar to a shared medical appointment, on diabetes management. This nurse-led care delivery model involved a multidisciplinary team including a dietician, pharmacist, psychologist, as well as overseeing physicians. After 6 months, the study showed a reduction of HbA1c by 1.3% from baseline for the intervention group [8].

SMAs also have the potential to offer diabetes care that is more efficient and decreases primary care burden [6]. There is a gap in literature focusing on the comparison of a diabetes SMA to other care strategies, such as the standard face-to-face visits with a diabetes specialist or a primary care physician [6]. In 2012, in an effort to build upon existing diabetes management resources and to improve veterans' glycemic control, a shared medical appointment was initiated at the Charles George VA Medical Center (CGVAMC). This SMA clinic, entitled Making Improvements in Diabetes by Achieving Set goals (MIDAS), is comprised of a clinical pharmacy specialist, a clinical psychologist, a certified diabetes educator nurse, a dietician, and a primary care nurse. The purpose of the study was to determine the impact of shared medical appointments on diabetes outcomes. In addition, we hoped to identify patient characteristics that could facilitate greater improvement in HbA1C through management via Shared Medical Appointments by exploring previous mode of diabetes management, mental health utilization, and service connection status.

Research Design and Methods

Sample selection

This study was conducted to evaluate the influence of a shared medical appointment (SMA) on HbA1C, weight, and primary care visits in patients with type 2 diabetes. Secondary objectives included determining primary care utilization as a result of enrollment in SMA, the impact of modality of diabetes management prior to SMA, the impact of disability or mental health functioning on SMA enrollment, and the relation of improvement in HbA1C to the number of SMA clinic visits. Patients were included for study analysis if they had type 2 diabetes and attended 2 or more SMA's from July 1, 2012 through December 31, 2015. Patients were excluded from the study if they had attended <2 SMAs. One hundred twenty one patients were reviewed for inclusion in this retrospective study. After assessing patients by the inclusion and exclusion criteria, 74 patients were eligible for inclusion in data analysis. Following data analysis, 71 patients were eligible for final evaluation.

Data collection

This retrospective study was conducted upon IRB/R&D approval at Charles George VA Medical Center. The study evaluated the electronic medical record of patients who attended 2 or more appointments in the MIDAS SMA clinic at the CGVAMC from July 1, 2012 through December 31, 2015. Data points correlating to the objectives of the study were collected and analyzed from the dates of July 1, 2011 through December 31, 2016.

Results

Patients served as their own control group by comparing data measures before presentation to the SMA and afterwards. Data points relating to A1c and weight at time of first MIDAS visit and years 1, 2, or 3 following that visit were included for t ± 3 months for maximum data inclusion. A paired samples t-test was used to determine a change in A1C and weight one year before and then following the first SMA visit. Patients with no A1c measurements at years 1, 2, or 3 were not included in the data analysis. For those without an A1c within 3 months of the first MIDAS visit, the A1c from up to one year prior was used as a baseline comparison. Previous mode of diabetes management, level of service connection, and mental health enrollment were collected for each patient, along with number of primary care and mental health visits at years 1, 2, and 3.

Data analysis

Statistical analysis used a paired samples t-test to compare the means of primary outcomes in in the SMA clinic. As part of exploration of secondary objectives, correlations were conducted to explore whether service connected disability or indicators of mental health severity were associated with HbA1c outcomes. If possible confounds were apparent from the results of the bivariate correlation matrix, the confounds were entered as a covariate in regression analyses using last HbA1c as the dependent variable. Differences were considered significant at $p < 0.05$. A total of 71 patients were included in this study. **Table 1** shows the demographic variables of the study population. Most study subjects were male (97%; n = 69), with 61 of those Caucasian. About 50% of patients were in the highest range of service connection (50-100%). Thirty-three of 71 patients were receiving mental health services. All patients were prescribed medication for diabetes, which varied from oral agents alone to insulin regimens of basal and bolus insulin.

Characteristic	Value
Age (mean ± SD years)	64.48 ± 7.715
Gender, no. (%)	Male = 69 (97.2)
	Female = 2 (2.8)
Ethnicity, no. (%)	Caucasian = 61 (85.9)
	Black/African American = 7 (9.9)
	Hispanic = 2 (2.8)
	Native American = 1 (1.4)
Service Connection Range, no. (%)	NSC = 22 (31.0)
	<50 = 11 (15.5)
	50-100 = 38 (53.5)
Mental Health Enrollment, no. (%)	Yes = 33 (46.5)
	No = 38 (53.5)

Table 1: Patient Demographics.

A statistically significant difference was found in HbA1c at years 1 and 3 when compared to baseline (p-value=0.003 and 0.037, respectively.) The final HbA1c value at year 1 decreased by an average 0.8833 points, while the HbA1c at year 3 dropped by an average of 0.6129 **(Table 2).** There was no statistically significant difference in baseline weight and weights at years 1, 2, or 3 **(Figure 1)**. None of the secondary variables, including mental health utilization (r=-0.015, p-value=0.938), or service connection (r=-0.176, p-value=0.183) showed any relationship with HbA1c values.

HbA1c	Mean A1c (%)	Mean Difference from Baseline (%)	Standard Deviation	P-value
Baseline	9.25%			
Year 1	8.40%	0.8833	2.2105	0.003
Year 2	8.63%	0.351	2.2866	0.072
Year 3	8.48%	0.6129	2.2555	0.037

Table 2: HbA1C Results.

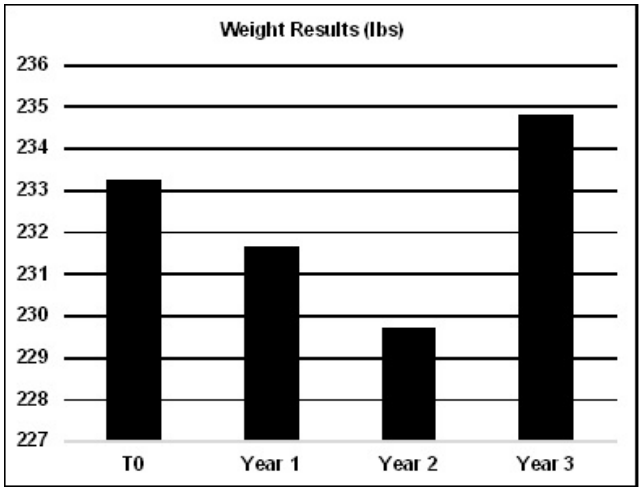

Figure 1: T0=time of SMA enrolment;Year 1=1 year following SMA enrollment (± 3 months);Year 2=2 years following SMA enrollment (± 3 months);Year 3=3 years following SMA enrollment (± 3 months).

Discussion

While there is data to support improvement in diabetes outcomes through management via SMA, there is little addressing an SMA with a design similar to the MIDAS clinic described above. According to the systematic review of shared medical appointments for diabetes conducted by Edelman, et al. [7] there was an average of -0.55% change in HbA1c throughout the 17 unique studies [6]. Our study strengthened current literature by showing a significant decrease in HbA1c through this mode of management. In the systematic review, only 4 of 17 studies reviewed included licensed mental health professionals as part of the SMA medical team. Only nine of those studies incorporated a pharmacist [6]. Sadur, et al. [8] conducted a randomized controlled trial evaluating a shared medical appointment with a very similar model to that of MIDAS. Groups of 10-18 patients met monthly with a multidisciplinary team including a diabetes nurse educator, dietician, behaviourist, and a pharmacist. Patients were randomized into the intervention group (SMA) or control (primary care physician management). After 6 months, HbA1c declined by an average of 1.3% for the intervention group, as opposed to 0.22% for the control group [8]. This amount of HbA1c lowering is greater than that found in this study. This could be due to the larger sample size included and more intensive follow-up (1 month vs. 1.5 to 3 months in MIDAS). However, the amount of HbA1c lowering identified in the study at CGVAMC is greater than that found in most trials included in the systematic review of SMAs. Since the HbA1c lowering identified by both this study and Sadur, et al. [8] was greater than that in the systematic review, perhaps the addition of a clinical psychologist and pharmacist to the team could promote better outcomes.

At this time, there is little data about the most appropriate patient for a diabetes SMA referral. Those with comorbid depression and diabetes are more likely to have poorer outcomes due to decreased adherence to dietary and pharmacologic interventions [9]. Therefore, individuals with mental health conditions may benefit from more intentional diabetes management and follow-up. By using mental health as an indicator of severity of illness and service connection as an indicator of disability, the study hoped to draw some conclusions regarding these measures and associated improvement in HbA1c. The limited sample size may have contributed to the lack of identified associations between secondary variables and HbA1c. The study was unable to meet a power of 0.8 due to the small sample size. However, reaching statistical significance in HbA1c despite this limitation shows the potential for even greater impact on diabetes outcomes, which could be shown through a larger sample size.

Another limitation to this study involved missing data. Since the study was retrospective in nature, not all study subjects had HbA1c and weight values drawn at the specific time points defined in the protocol. To account for this, the primary study analysis was also run using the mean imputation method. There was no difference in mean outcomes when compared to raw data.

Future research opportunities include expansion of the study to involve more subjects as the SMA continues, with the hope of strengthening power and identifying specific patient subsets that may benefit more from SMAs. Another area for research exploration could be to assess patient satisfaction in this type of disease management setting. There is currently limited literature addressing SMA effect on patient experience. Sadur, et al. [8] explored both patient satisfaction and the effects of the intervention on health care utilization and cost of care. Self-care practices, as well as documented individual nutrition consults, improved significantly in the intervention group. Patients also reported greater post intervention satisfaction in diabetes care, as compared to those receiving usual care. It would be appropriate to expand on these findings by answering the following questions: How does patient confidence in diabetes self-management change as a result of more holistic care? Is a patient's perceived level of diabetes control better/worse/consistent regardless of numerical HbA1c improvement?

Conclusions

Shared Medical Appointments are an effective mode of delivery of diabetes care, leading to statistically significant decreases in A1c over a three-year period. Further research is needed to delineate the specific

characteristics of patients more likely to benefit from a diabetes SMA as opposed to other modes of diabetes care.

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