Shared Medical Appointments and Their Effects on Achieving Diabetes Mellitus Goals in a Veteran Population

Anthony Tardi, PharmD, BCACP; Seema Kapadia, PharmD, BCACP; Molly Kurpius, PharmD, BCACP; Colleen Fairbanks, PhD; and Julie Foglio, PharmD

Patients who participated in shared medical appointments experienced significant improvements in glycemic control.

In 2012, 9.3% of the U.S. population had diabetes mellitus (DM).[1] According to the American Diabetes Association, in 2012, the total cost of diagnosed DM in the U.S. was $245 billion.[2] Diabetes mellitus is a leading cause of blindness, end-stage renal disease, and amputation in the U.S.[3] Up to 80% of patients with DM will develop or die of macrovascular disease, such as heart attack or stroke.[3]

Diabetes mellitus is a chronic disease of epidemic proportion with management complexity that threatens to overwhelm providers in the acute care and primary care settings. Limited specialist availability and increased wait times continue to afflict the VA health care system, prompting efforts to increase health care provider (HCP) access and improve clinic efficiency.[4] One of the methods proposed to increase HCP access and maximize clinic efficiency is the shared medical appointment (SMA).[5,6]

The SMA was designed to improve access and quality of care through enhanced education and support. With the number of people living with chronic diseases on the rise, the current patient-provider model is unrealistic in today's health care environment. Shared medical appointments offer a unique format for providing evidence-based chronic disease management in which patients and a multidisciplinary team of providers collaborate toward education, discussion, and medication management in a supportive environment.[7]

Research has suggested that SMAs are a successful way to manage type 2 DM (T2DM).[8,9] However, there is uncertainty regarding the optimal model design. The goals of this study were to evaluate whether the diabetes SMA at the Adam Benjamin, Jr. (ABJ) community-based outpatient clinic (CBOC) was an effective practice model for achieving improvements in glycemic control and to use subgroup analyses to elucidate unique characteristics about SMAs that may have been correlated with clinical success. This study may provide valuable information for other facilities considering SMAs.

OVERVIEW

The Jesse Brown VAMC (JBVAMC) and the ABJ CBOC implemented a T2DM-focused SMA in 2011. The ABJ CBOC multidisciplinary SMA team consisted of a medical administration service clerk, a registered dietician, a certified DM educator, a registered nurse, a nurse practitioner (NP), and a clinical pharmacy specialist (CPS). This team collaborated to deliver high-quality care to patients with poorly controlled T2DM to improve their glycemic control as well as clinical knowledge of their disease. A private conference room at the ABJ CBOC served as the location for the SMAs. This room was divided into 2 adjacent areas: One area with tables was organized in a semicircle to promote group discussion as well as minimize isolated conversations; the other area had computer terminals to facilitate individualized medication management. Other equipment included a scale for obtaining patient weights and various audio-visual devices.

The ABJ CBOC offered monthly SMAs. The team made several

Dr. Tardi, Dr. Kapadia, and Dr. Kurpius are clinical pharmacy specialists at the Jesse Brown VAMC and clinical assistant professors at the University of Illinois-Chicago College of Pharmacy, all in Chicago, Illinois. Dr. Fairbanks is a mental and behavioral health psychologist and Dr. Foglio is a PGY-1 pharmacy practice resident, both at the Jesse Brown VAMC.

Table 1. Baseline Characteristics

Characteristics, No.	SMA Group, 62	Control Group, 62	P value
Mean age ± SD, y	63.4 ± 8.5	62.0 ± 10.1	.41
Gender, No. (%) Male Female	 58 (93.5) 4 (6.5)	 62 (100) 0 (0)	 .12 .12
Race, No. (%) White African American Other	 39 (62.9) 17 (27.4) 6 (9.7)	 39 (62.9) 16 (25.8) 7 (11.3)	 .99 .99 .99
Mean baseline A_{1c} (%) ± SD	10.44 ± 1.77	9.93 ± 1.44	.09
Mean ABW (kg) ± SD	111.70 ± 25.60	108.90 ± 23.50	.52
Mean BMI (kg/m²) ± SD	35.80 ± 8.20	34.20 ± 6.60	.22

Abbreviations: A_{1c}, hemoglobin A_{1c}; ABW, actual body weight; BMI, body mass index; SMA, shared medical appointment.

attempts to maximize SMA show rates, as previous studies indicated that low SMA show rates were a barrier to success.[3,4,7-9] One review reported no-show rates as high as 70% in certain group visit models.[4] About 2 weeks prior to a session, prospective SMA patients received automated and customized preappointment letters. Automated and customized phone call reminders were made to prospective SMA patients a few days before each session. As many as 18 patients participated in a single ABJ SMA.

The ABJ SMAs lasted from 60 to 90 minutes, depending on the level of patient participation and the size of the group. The first half of the SMA was dedicated to a group discussion, which involved the SMA team, the patient, and the patient's family (if desired). The topic of conversation was typically guided by patient curiosity and knowledge deficits in a spontaneous and free-flowing manner; for this reason, these sessions were considered to be open.

The team also engaged in more structured focused sessions, which limited the spontaneous flow of conservation and narrowed the scope to provide targeted education about various aspects of T2DM care. During focused sessions, services such as dental, optometry, podiatry, MOVE! (a VA self-management weight reduction program), and nutrition also participated. Focused sessions addressed topics such as hypoglycemia management, eating around the holidays, sick-day management of T2DM, grocery shopping, exercise, oral health, eye care, and foot care. The specialty services were encouraged to be creative and interactive during the SMA. Many of these services used supportive literature, demonstrations, diagrams, and props to enrich the educational experience. Group discussion typically lasted 30 to 40 minutes; after which, patients met individually with either a CPS or NP for medication management.

Medication management focused on optimizing T2DM therapy (both oral and injectable) to improve glycemic control. Interventions outside of T2DM therapy (eg, cholesterol, hypertension, and other risk reduction modalities) were not made, due to time constraints. Once a patient demonstrated improved working knowledge of T2DM and a clinically significant reduction in their glycosylated hemoglobin A_{1c} (A_{1c}) they were discharged from SMAs at the discretion of the SMA team. There was no set minimum or maximum duration for the SMAs.

METHODS

This study was a retrospective chart review conducted at the JBVAMC and was approved by the institutional review board and the research and development committee. Patient confidentiality was maintained by identifying patients by means other than name or unique identifiers. Protected health information was accessible only by the aforementioned investigators. There was no direct patient contact during this study.

Patient lists were generated from the computerized patient record system (CPRS). Patients were tracked up to 6 months after SMA discharge or until the last SMA in which they participated. The control group was matched according to location, age, glycemic control, and time. The control group never attended an ABJ SMA but may have received regular care through their primary care provider, CPS, or endocrinologist. Prospective control group patients were randomized and reviewed sequentially to obtain the matched cohort.

The study took place at ABJ, an outpatient clinic serving veterans in northwest Indiana and surrounding areas. Inclusion criteria for the SMA group were patients with T2DM, aged ≥ 45 years, with an A_{1c} ≥ 8.5%

seen at ABJ for T2DM from May 1, 2011, to June 30, 2013. The control group included patients with T2DM, aged ≥ 45 years, with an $A_{1c} > 9\%$ who never attended SMAs but may have received regular care at ABJ during the study period. The SMA group's inclusion criteria threshold for A_{1c} was lower in order to maximize sample size. The control group's inclusion criteria threshold for A_{1c} was higher due to use of a default reminder report called "$A_{1c} > 9\%$" to generate patient lists. Patients were excluded from the study if they did not meet inclusion criteria.

Baseline datum was the most recent parameter available in CPRS prior to enrollment. The endpoint datum was the parameter nearest the time of SMA discharge or the first available parameter within 6 months from the date of discharge. In the control group, the baseline datum was the initial parameter during the study period and the endpoint datum was the closest measure to 4 months after baseline. Four months was chosen to allow for at least 1 A_{1c} measurement during the study period. In addition, it was estimated (prior to collecting any data) that 4 months was the average time a patient participated in SMAs. Serial A_{1c} measurements were defined as values obtained at SMA discharge and 3- and 6-months postdischarge. These parameters were used to evaluate the sustainability of improvements in glycemic control. All values falling outside of these defined parameters were excluded.

The data analysis compared A_{1c} change from baseline to endpoint for the SMA and control groups. Data collection included baseline characteristics, SMA show rate, number of SMA patients seen by a CPS or NP, number and type of SMA interventions made by a CPS or NP, and the number and type of

Table 2. Secondary Endpoints

Change in Mean Shared Medical Appointment A_{1c} Values	Result ± SD (No.)
Baseline A_{1c} [a] $\quad$ $A_{1c} \geq 10\%$ $\quad$ $A_{1c} < 10\%$	-2.26 ± 2.56 (27) $\quad$ -0.87 ± 1.64 (35)
Type of session[b,c] $\quad$ Open session $\quad$ Focused session	-1.16 ± 1.78 (15) $\quad$ -2.27 ± 2.72 (16)
Provider[c,d] $\quad$ Clinical pharmacy specialist $\quad$ Nurse practitioner	-1.96 ± 2.52 (27) $\quad$ -1.18 ± 2.44 (16)

Abbreviation: A_{1c}, hemoglobin A_{1c}.
[a]Statistically significant.
[b]31 patients excluded as they participated in both open and focused sessions.
[c]Not statistically significant.
[d]19 patients excluded, because they were seen by both a CPS and a NP.

non-SMA interventions made during the study period. Intervention types were medications: added, discontinued, or titrated; and other, defined as referrals made to specialty services (such as dental, optometry, and podiatry).

Secondary endpoints included the number of SMAs and glycemic improvement, SMA format style (open- vs focused session) and glycemic improvement, SMA provider (CPS vs NP) and glycemic improvement, the change in A_{1c} stratified by baseline A_{1c} ($A_{1c} \geq 10\%$ vs < 10%), the change in actual body weight (ABW) and body mass index (BMI), and maintenance of A_{1c} (3- and 6-months postdischarge).

The primary endpoint was evaluated using a 2-sample Student t test. Secondary endpoints were evaluated using the independent t test. Statistical significance was defined as $P < .05$.

RESULTS

A total of 129 unique patients were scheduled for SMAs, 62 of which met inclusion criteria and were included in the SMA group. During enrollment, 67 patients were ex-

cluded: 55 never participated in SMAs, 6 had baseline A_{1c} values < 8.5%, 4 had insufficient data, and 2 were aged < 45 years. A total of 29 SMAs were conducted during the study period, and patients attended an average of 3.15 ± 2.14 (SD) SMAs. The average attendance at each SMA was 7.1 ± 2.62 (SD) patients. For the control group, 754 unique patients were identified and randomized. A total of 90 charts were sequentially reviewed in order to obtain the 62 patients for the control group.

Baseline characteristics were balanced between groups. However, there were more women in the SMA group vs the control group (Table 1). Within the control group, there were a total of 107 appointments that addressed T2DM, which averaged 1.72 ± 1.51 (SD) appointments per patient. The total number of interventions made in the SMA group was 192: 64.6% (124) by a CPS and 35.4% (68) by a NP. For the CPS, the most frequent intervention was medication titration (69.5%), followed by other (23.5%), medication addition (4%), and medication discontinuation (3%). Of note, 53.2% (33) of the SMA patients were seen an average of

Table 3. Changes From Baseline to Endpoint

Secondary Endpoints: Changes in Body Weight and Body Mass Index			
Parameter (No.)	SMA (62)	Control (62)	*P* value
Change in body weight (kg) ± SD	-0.82 ± 4.99	-0.73 ± 5.46	.45
Change in BMI (kg/m^2) ± SD	-0.24 ± 1.68	-0.21 ± 1.77	.46
Secondary Endpoints: Serial A$_{1c}$ Values			
Postdischarge Date	SMA A$_{1c}$ Change	Control A$_{1c}$ Change	*P* value
3 months (% ± SD); n	-0.15 ± 0.01; 20	-0.31 ± 0.01; 35	.33
6 months (% ± SD); n	+0.62 ± 0.02; 49	-0.01 ± 0.02; 38	.06

Abbreviation: A$_{1c}$, hemoglobin A$_{1c}$.

1.2 times by non-SMA providers. The SMA patients had a total of 45 non-SMA interventions (0.73 per patient) during the study period.

For the primary endpoint, the SMA group had a 1.48% ± 0.02 (SD) reduction in A$_{1c}$ compared with a 0.6% ± 0.02 (SD) decrease in the control group (*P* = .01). When evaluating mean changes in A$_{1c}$ by the number of SMAs attended, it was noted that participation in ≥ 6 SMAs led to the greatest reduction in A$_{1c}$ of 2.08%. In the SMA group, it was noted that patients with higher A$_{1c}$ values at baseline demonstrated greater improvements in glycemic control compared with patients with lower baseline A$_{1c}$ values. The mean change in A$_{1c}$, stratified by baseline A$_{1c}$, was -2.26% for those with baseline A$_{1c}$ values ≥ 10% and -0.87% for those with baseline A$_{1c}$ values < 10%.

In evaluating the format style, open- vs focused-session, it was observed that participation in focused sessions led to greater improvements in glycemic control. Furthermore, when stratified by provider, greater improvements in glycemic control were demonstrated when medication management was completed by a CPS vs a NP (Table 2). The average number of interventions per SMA patient was 3.1 ± 2.22 (SD). For the control group, the total number of interventions made was 86, with an average of 1.37 ± 1.51 (SD) per patient. The overall show rate was 49% ± 16 (SD), 52% ± 16 (SD) for open visits, and 46% ± 15 (SD) for focused visits. The mean change in ABW and BMI from baseline to endpoint was no different between the SMA and control groups (Table 3). The SMA group participants demonstrated a decrease in A$_{1c}$ at 3 months postdischarge, and a moderate increase in A$_{1c}$ was noted at 6 months postdischarge.

DISCUSSION

Shared medical appointments provide an effective alternative to standards of care in order to obtain improvements in glycemic control. Consistent with previous studies, this study reported significant improvements in glycemic control in the SMA group vs the control group. This study also elucidated unique characteristics about SMAs that may have been correlated with clinical success.

Although the greatest improvements in glycemic control were noted for those who participated in ≥ 6 SMAs, it was observed that participation in only 1 SMA also led to improvements. For a site with limited staff and a high volume of patients waiting to participate in SMAs, it may be mutually beneficial to offer only 1 SMA per patient. In addition, patients with ≥ 10% A$_{1c}$ at baseline demonstrated greater improvements in glycemic control compared to those with < 10% A$_{1c}$ at baseline. The reasons the higher baseline A$_{1c}$ subgroup responded to interventions more robustly are unclear and likely multifactorial. Nonetheless, factors such as psychosocial influences (eg, peer pressure to get healthy) may have increased motivation to prevent complications and improved medication adherence in the setting of closer follow-up. Additionally, hyperresponsiveness to drug therapy may have played a role. Regardless, for new SMA programs interested in making an immediate impact, it may be advantageous to initially select patients with very poorly controlled DM.

A unique aspect of the ABJ SMA was the variety of focused sessions offered. Previous studies did not demonstrate such a variety of focused sessions, nor did they evaluate the impact of a focused visit on the patient's T2DM control. Participation in focused ABJ SMA sessions may have led to improved T2DM control, which may be attributed to the value patients assigned to specialty care and an increased motivation to get healthy.

Another factor that may have led to improved T2DM control was CPS involvement with medication management. The presence of a NP was highly valued, both from a group discussion and medication management standpoint; still, it is a good idea to involve a CPS who has a strong command of DM

pharmacotherapy. One shortcoming of this SMA program was the inability for patients to maintain glycemic improvements 6 months after discharge. This pitfall was likely the result of suboptimal coordination of care after SMA discharge and may be avoided by asking the medical administration service clerk to promptly schedule discharged SMA patients for a general medicine clinic T2DM follow-up.

The SMA patients had more T2DM interventions within the same time frame compared with the control patients. Although not causative, the increased number of interventions in addition to the bolstered support of the SMA may have correlated with glycemic improvements.

An important finding of this study was the SMA show rate and how it compared with attendance rates found in other group models. The favorable ABJ SMA show rate could have been due to the rigorous attention paid to reminder letters and phone calls. The literature has not established a standard approach to increasing SMA show rates; however, the current data suggest that increased reminders may have increased attendance.

Limitations

This study had several limitations. The external validity was weakened by the modest sample size and the homogenous baseline characteristics of those enrolled. Another limitation was inconsistent documentation of laboratory parameters. The inability to obtain A_{1c} values exactly at enrollment and discharge could have potentially skewed the results. In addition, incomplete documentation of

interventions for dual-care patients (ie, those who obtained care outside of the VA) was an unavoidable challenge. Last, this study did not perform an assessment of SMA patient satisfaction, cost-benefit, or safety.

CONCLUSION

The ABJ SMA was an effective addition to standards of care in order to achieve improvements in glycemic control in a veteran population with poorly controlled T2DM. Furthermore, the data suggest that a successful program should be multidisciplinary, select poorly controlled patients, offer focused sessions, have a CPS participate in medication management, and encourage patients to complete ≥ 6 sessions. Future studies should be conducted to include more diverse patients to see whether the efficacy of this SMA format is maintained.

A safety analysis should also be conducted to ensure that the SMA format is not only effective, but also a safe means to manage medical conditions. In addition, the scope of the ABJ SMAs should be expanded to allow for evaluation of other diseases. An evaluation of patient satisfaction and cost-benefit could provide additional support for the implementation of SMAs, as improvements in quality of life and cost savings are endpoints to be desired. ●

Author disclosures
The authors report no actual or potential conflicts of interest with regard to this article.

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