Effectiveness of Shared Medical Appointments Targeting the Triple Aim Among Patients With Overweight, Obesity, or Diabetes

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Financial Disclosures: None reported.

Support: None reported.

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Submitted June 7, 2016; revision received August 1, 2016; accepted September 13, 2016.

Background: Obesity and diabetes are epidemic in the United States, with many treatment options having limited long-term efficacy. A possible effective medical management tool is the shared medical appointment (SMA), which offers an efficient and cost-effective approach to behavior change and aligns with the Triple Aim (reduce costs, improve population health, and improve patient care experience) set forth by the Institute for Healthcare Improvement.

Objectives: To assess the effectiveness of SMAs to achieve the Triple Aim and to improve the management of overweight/obesity or diabetes.

Methods: Peer-reviewed literature from PubMed was searched by the keywords *shared medical appointments*, *group medical appointment*, and *group medical visit*, with no date restrictions and limited to English publications with sample sizes greater than or equal to 20.

Results: Eight articles met inclusion criteria. The Triple Aim was not referenced in the studies, but most reported some combination of reduced costs, improved care, and improved outcomes or patient satisfaction.

Conclusions: Potential benefits of SMAs include improved patient outcomes and satisfaction. Osteopathic and, in particular, primary care medicine could likely benefit from moving toward greater adoption of SMAs; however, more randomized controlled trials are needed to assess their effectiveness with regard to the Triple Aim.

J Am Osteopath Assoc. 2016;116(12):780-787
doi:10.7556/jaoa.2016.153

Keywords: group medical appointment, group medical visit, shared medical appointment, Triple Aim

Shared medical appointments (SMAs), while gaining popularity in select health care systems,[1,2] are still not considered a mainstream approach to health care delivery. Also referred to as *group medical visits*, SMAs are often undertaken as an alternative to one-on-one appointments in an effort to reduce costs, improve population health, and improve patient care experience (including quality and satisfaction). These 3 priorities make up the Triple Aim set forth by the Institute for Healthcare Improvement (IHI), which is an independent nonprofit organization that promotes improvements in health care.[3] A small but growing body of research indicates that SMAs are effective at achieving aspects of the IHI's goals,[4-9] but, to the authors' knowledge, no literature explicitly reports on the effect of SMAs on the Triple Aim. In patients with overweight, obesity, or diabetes for whom social support is of paramount importance,[10,11] SMAs may be especially useful.

Almost 70% of adults in the United States are overweight (body mass index [BMI], 25-29.9) or obese (BMI ≥30).[12] Additionally, just over 33% of children in the United States are overweight (obesity class I; BMI-for-age between the 85th and 94th percentile on the BMI-for-age growth chart), and almost 17.4% meet the criteria for obesity (obesity class II; BMI-for-age ≥95th percentile).[13] Excess body weight is a modifiable risk factor for reducing the incidence of prediabetes and type 2 diabetes mellitus (T2DM), so targeting body weight via SMAs is a sensible approach to risk reduction.[14]

Prediabetes is strongly linked to excess body weight and is on the rise among all segments of the US population.[12,15] A diagnosis of prediabetes should be considered when hemoglobin A_{1c} (HbA_{1c}) is 5.7% to 6.4% or a fasting blood glucose (FBG) level is between 100 mg/dL and 125 mg/dL.[16] Prediabetes and obesity are highly predictive of T2DM developing.[17] Intervening with SMAs might be effective in managing obesity and prediabetes, which in turn should diminish the risk for the development of T2DM.

Weight loss interventions targeting obesity or diabetes have limited long-term efficacy and, depending on the population, different approaches are used, including SMAs.[18,19] For children, typical interventions include family, community, school, and health care components and are more likely to lead to long-term weight improvements.[20] For adults aged 60 years or older, effective weight loss interventions typically include (1) prescription of a moderate reduced-calorie diet (eg, reducing energy intake by 500 kcal/d); (2) prescription of increased physical activity; and (3) behavioral strategies to facilitate adherence to diet and activity recommendations.[21] A confounding problem is that adults with obesity who are seen by primary care professionals for issues not overtly related to obesity in the patient's mind (eg, knee and back pain, depression) are frequently not counseled to make lifestyle changes or achieve a healthy weight unless other obesity-related comorbidities are present (eg, sleep apnea, diabetes).[22,23] The Diabetes Prevention Program, while effective for adult weight loss and slower progression to diabetes,[24] lacks primary care facilitation, which is included in SMAs. Wider adoption of SMAs might be able to remedy some of these challenges.

Shared medical appointments follow 1 of 2 general formats: (1) cooperative health care clinics, which are typically used to provide care to elderly patients who fall in the high-use category or patients with chronic conditions, or (2) drop-in group medical appointments, in which patients attend SMAs only when they have a specific need.[25]

In contrast to traditional one-on-one appointments with health care professionals, which usually last less than 20 minutes,[26,27] SMA facilitation is done by an interprofessional team comprising a primary care health care professional and an allied health care professional (often an educator such as a nurse or registered dietitian) and lasts 60 to 120 minutes. Patients are assigned to SMAs based on a shared chronic condition (eg, diabetes, chronic pain, asthma). Acting as both a medical appointment and a peer social support group, SMAs are typically structured to accommodate approximately 10 to 15 patients and occur 1 to 2 times per month.[28] Some studies we reviewed provided information on billing, how a clinic operates, and coding for SMA.[25,29-31] More details on personnel, scheduling, coding, and billing are available from the American Academy of Family Physicians (http://www.aafp.org/practice-management/payment/coding/group-visits.html and http://www.aafp.org/dam/AAFP/documents/patient_care/fitness/GroupVisitAIM.pdf) and eMDs, Inc (http://www.e-mds.com/scheduling-and-coding-group-visits).

The proposed benefit of the SMA approach is twofold: (1) SMAs can positively alter the course of a patient's body weight and overall health; and (2) SMAs can offer a medically supervised social support mechanism. This combination has a domino effect on the obesity-related comorbidities of prediabetes, T2DM, and cardiovascular disease.

The goal of this literature review was to summarize and update the current findings concerning the degree to which SMAs were shown to achieve the IHI's Triple Aim and the role of SMAs in managing overweight/obesity or diabetes. Patient experiences, perceptions of health care professionals, physician efficiency, clinical efficacy, cost, and the use of osteopathic tenets were the outcomes of interest. We focused on the cooperative health care clinic model of the SMA, as it was designed to target chronic disease management.

Methods

A literature search in PubMed was conducted using the following search phrases: *shared medical appointment*, *group medical appointment*, and *group medical visit*, with no date restrictions. The inclusion criteria were interventional studies on overweight/obesity or diabetes with sample size greater than or equal to 20. Criteria for exclusion were review articles and articles not in English. The grey literature (eg, government or industry reports) was not evaluated.

Results

The initial search identified 43 articles published between September 2006 and June 2015, 1 of which was not in English and 1 of which was a duplicate. The remaining 41 articles were reviewed for study type, sample size, population studied, outcomes, and presence of an intervention. Twenty-eight of 41 articles addressed diabetes or obesity, and 8 of those met all inclusion criteria.[6,32-38] Five of these articles included data related to diabetes alone[33-38]; 2 included diabetes and overweight/obesity together[6,32]; and 1 addressed overweight/obesity alone.[37] The 8 articles reviewed addressed both pediatric and adult populations.

Pivot tables were created to organize the data based on SMA intervention and the population of persons with overweight/obesity or diabetes. Comparisons were drawn for each individual criterion and together.

The Triple Aim was not discussed explicitly in any of the articles reviewed. However, each of the 3 components were mentioned independently. The 3 components of the Triple Aim are listed in the *Table* as they are discussed in each article.

Discussion

To our knowledge, this is the first review of the literature focused on studies that used an SMA design among a patient population with overweight/obesity or diabetes and that considered how SMAs may have addressed the goals of the Triple Aim. Osteopathic medicine is well-suited to adopting an SMA approach given its primary care, patient-centered focus. Many primary care practices have large numbers of patients with overweight, obesity, prediabetes, diabetes, and other chronic diseases.

Feedback on SMAs by Patients and Health Care Professionals

Two articles focused on the interactions and perspectives of the patients, parents, and health care professionals. Noordman and van Dulmen[34] looked at a pediatric population with type 1 diabetes mellitus and used quantitative methods by counting cues and response types during a recorded SMA among health care professionals, parents, and patients to determine whether each response and cue was appropriately addressed. The authors found that nearly all patient questions and cues were responded to appropriately by the health care professionals. Mejino et al,[35] reporting on the same group of children and adolescents with type 1 diabetes as in the article by Noordman and van Dulmen,[34] used a survey to obtain perspectives of health care professionals, parents, and patients before and after the SMA. The responses from parents and patients who attended the SMA and their reasons for participating were related to the shared experiences

they gained, the ability to learn from fellow patients, and the opportunity to receive more information about their disease process.

The experiences of health care professionals were generally positive; in the articles we reviewed, SMAs were found to improve workflow.[33,35,39] Mejino et al[35] asked health care professionals to share why they chose to participate in SMAs, and the responses emphasized the preference for variation in workday flow and experiences. Overall, the study found that both patients and health care professionals were satisfied with SMAs. This was the only study in our sample to report health care professionals' responses directly.

Shared medical appointments have been studied using different types of health care professionals and interprofessional teams, including physicians,[39] a family nurse practitioner who was also a certified diabetes educator,[33] and a pharmacist-led SMA operated by the Veteran's Health Administration.[36] The different types of health care professionals used as facilitators in SMAs vary from practice to practice. Although this group of articles had less information on the experiences of health care professionals, a common theme of better productivity was observed with the SMA model for chronic care[6,36] as well as improved availability and interactions between patients and health care professionals.[6,32,34,38]

Table.
Triple Aim[a] Concepts in Literature on Effectiveness of Shared Medical Appointments for Patients With Overweight/Obesity, or Diabetes

Study	Reduced Cost	Improved Population Health	Increased Patient Experience
Cole et al[6]	X	X[b]	
Geller et al[38]			X
Guthrie and Bogue[32]	X	X	X
Hinchman et al[37]	X	X	
Mejino et al[35]			X
Noordman and van Dulmen[34]			X
Riley[33]	X	X	X
Taveira et al[36]		X[c]	

[a] The Triple Aim (reduce costs, improve population health, and increase patient experience) comprises priorities set forth by the Institute for Healthcare Improvement.
[b] Equivalent but not superior.
[c] Better glycated hemoglobin control but no long-term findings were reported.

Triple Aim

Reducing Costs and Increasing Efficiency of Health Care Professionals

Three articles addressed resource management costs for SMAs, in addition to clinical outcomes, such as weight loss or diabetes.[6,32,37] Hinchman et al[37] described in depth how SMAs influenced resource management in a childhood obesity program. The program, created ba physician in 2001, is called Operation Zero because the primary goal is zero incidence of health-related problems associated with overweight/obesity. The goal of the program was to be reproducible across a large health care system, so there were many details given about cost per participant and the resources needed to implement the program. Hinchman et al[37] reported the cost for the core program (weekly 1-hour appointments for 2 months; $2000, or $137 per participant) and for the After–Operation Zero program (4 more SMAs every 3 months; $1200, or $80 per participant). Although this study did not include the billing procedures or billing codes used, the authors concluded that the program can be reproduced and that SMAs improved clinical goals and reduced long-term cost of care.

Two studies[32,33] commented on forms of reimbursement, using established patient level 2 to 4 *Current Procedural Terminology* code 99212, 99213, or 99214. This guideline meant that 7 to 8 participants were seen per hour instead of the 6 who would be allotted in the typical 20-minute individual patient–physician appointment format. In the Guthrie and Bogue study,[32] all 49 participants were also invited to SMAs, but it was unclear how many participants were at each 90- to 120-minute session.

Cole et al[6] also provided details about SMA resource needs without addressing *Current Procedural Terminology* codes. Outcomes of 90-minute SMAs for 6 to 8 patients were equivalent to outcomes of individual 60-minute SMAs for patients with prediabetes. The staff included a screener, session recorder, health care professional (certified diabetes educator registered dietitian), and facilitator (behavioral specialist, registered nurse, or registered dietitian). Although cost had not been directly compared with ancillary staff and time for preparation, initial review of billing and number of patients seen showed a reduction in cost and improvement in efficiency.

Improving Population Health: Weight Loss in Diabetes Management

Three of the studies[6,32,37] focused on weight loss, which is an important strategy to prevent T2DM or improve diabetes management. One study used a combined DVD-based diabetes education program focused on 7 target behaviors related to nutrition for weight loss and an SMA to determine which behaviors provided the most effective results.[32] The participants were mostly women, aged 46 to 86 years, with T2DM. There was a 4.1% reduction in body weight in the group with a mean starting weight of 214.7 lb. However, the effects on glycemia were not reported because the focus of the study was on behavior modification and nutritional habits.

Cole et al[6] recruited patients with prediabetes, most aged in their 50s (mean [SD] age, 58.3 [9.6] years) with an average BMI of 30.8, mean baseline weight of 86.2 kg, and FBG of 100 to 120 mg/dL. For each monthly 90-minute SMA, 6 to 8 patients were included over the course of 3 months and had a mean weight loss of 6.6 lb and a 6-mg/dL decrease in FBG level. Neither the control nor the SMA groups achieved the desired 5% weight loss, nor did they have clinically significant improvements in FBG levels; however, systolic blood pressure and total cholesterol levels improved in the SMA group. They found no decrease in HbA_{1c} at 1 year among the SMA group, while the HbA_{1c} of the control group increased.[6]

Hinchman et al[37] focused on a pediatric population with BMI-for-age at or above the 85th percentile, which is diagnostic of overweight. They recruited patients from the clinic's pediatric population who were at risk of becoming overweight or were already overweight or obese to be in the Operation Zero SMA group. Insulin resistance was not part of the inclusion criteria; however, 87% of participants had some level of insulin resistance at baseline as determined by FBG levels. Postintervention blood glucose levels were not reported. These SMAs were designed to be family-oriented meetings (1 parent or guardian per patient was required to participate in each session) with interactive sessions and creative problem solving. After the 8-week intervention, participants in the Operation Zero SMA group were found to have a statistically significant reduction in percentage of body fat and waist circumference (−1.18% body fat change; −0.61 inches, respectively; $P<.05$).[33] These articles together[6,37] illustrate that SMAs can be an effective adjunct to behavior change approaches that target adults as well as children and adolescents with overweight or obesity and, in some cases, can lead to improved management of diabetes.

Two studies were distinct in their methods and health care professional goals for the use of SMAs in diabetes management. They focused on HbA_{1c} improvement while also targeting lipid levels and blood pressure. Riley[33] focused on lifestyle modifications for HbA_{1c} improvement in a pilot study. The author used the Stages of Change Theory as a foundation to change health behaviors that lead to improved glycemic control. They found a mean reduction in HbA_{1c} by 1.1 points ($P=.009$); reduction in body weight by a mean of 3.01 lb ($P=.001$); and a reduction in diastolic blood pressure by a mean of 5.76 mm Hg ($P=.002$). The group dynamic was built specifically for social support

and encouragement to help patients better adhere to lifestyle modifications.[33]

Taveira et al[36] also focused on HbA_{1c} improvement in the Veterans Affairs Multidisciplinary Education and Diabetes Intervention for Cardiac Risk Reduction study. They used a pharmacist-led intervention structured in 4 weekly, 2-hour classroom sessions, with approximately 4 to 8 participants in each session. Taveira et al[36] sought to achieve the American Diabetes Association goals for glycemic control and related cardiovascular risk factors using pharmacotherapy and behavioral methods. Four months after starting the program, participants in the intervention group achieved an HbA_{1c} absolute mean (SD) change of −0.9 (1.6) (intervention vs usual care; $P<.05$). Overall, 40% of the participants achieved the HbA_{1c} goal of less than 7%, and only 20% of the usual care participants reached the goal.

The interventions used by Riley[33] or Taveira et al[36] were not able to reduce lipid levels with any significance, but both improved blood pressure. These 2 studies used different approaches to achieve the same end result, which was an improvement in HbA_{1c}. This direct comparison, as well as others in this review, demonstrates that the SMA can be adapted for the health care professional's goals and can be tailored to best meet the needs of the patient population.

Patient Experience: Quality and Satisfaction

The third aspect of the Triple Aim, patient experience with care, was studied by Riley[33] and Geller et al.[38] Patient satisfaction can be measured or inferred by assessing for depression or loneliness, or using a patient satisfaction survey. Riley[33] used both the Beck Depression Inventory and the Seattle Outpatient Satisfaction Questionnaire. Geller et al[38] used the Zung Depression Scale, UCLA Loneliness Questionnaire, and the 36-Item Short Form Survey, which assesses quality of life indicators. Both studies found a reduction in depression or loneliness after participation in an SMA. In an underserved Latino community, Geller et al[38] showed that over a period of 1 year of participation in SMAs, quality of life improved and loneliness decreased in a dose-response format. Participants who attended fewer than 7 SMAs had worse outcomes in these areas.

Guthrie and Bogue[32] assigned self-selected, eligible adult patients to 90- to 120-minute SMAs for 8 weeks, which included a 40-minute educational DVD on a lifestyle topic. Patients who were identified as "early adopters" of behavior change upon conclusion of the intervention were hypothesized to have been motivated by group dynamics and the shared personal stories that arose during SMAs. This study did not track medications at baseline or adjustments during the course of the study. It is possible that changes in medications could have led to decreased adverse effects and patient costs, which would contribute to patient satisfaction. Increased monitoring by health care professionals could have reduced hypoglycemia-related adverse events, which might have arisen with weight loss–induced glycemic control changes.

Limitations and Recommendations

The articles included were only those available in English through PubMed, and several articles were pilot studies. The Triple Aim was also not mentioned in any of these studies, so inferences were made during our review process based on experiences of patients and health care professionals, as well as costs. The heterogeneity of the studies reviewed is also a limitation.

Further research on the SMA model using randomized controlled trials with larger populations and in more diverse clinical settings is warranted. This will allow researchers to quantify the impact of SMAs on patients with overweight/obesity or diabetes and determine the economic ramifications on health care professionals and the health care system.

Conclusion

Many potential benefits of SMAs have been reported. Although not intended to replace self-management education classes,[29] the SMA format can offer practices a way to reduce costs, improve efficiency, improve patient care and outcomes, and lead to greater patient satisfaction. As part of the philosophy of osteopathic medicine, physicians seek to help the body to heal itself, and SMAs incorporate many aspects of a person's being (social, relational, analytical, emotional), thus providing the impetus to jumpstart the body (the person) to make lifestyle changes to improve health. To make an effective change as big as altering the course of obesity and diabetes requires a paradigm shift that can be fostered through SMAs.

Acknowledgment

We acknowledge Byron Haney, MD, for sharing his experiences and knowledge of SMAs with us.

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