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The modified medical office assistant role in rural diabetes care

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Introduction: Diabetes care in Canada is usually provided in family practice offices, which may not have nurses to provide planned, proactive care as recommended by guidelines. The use of medical office assistants (MOAs) to do key tasks in diabetes care may improve the effectiveness of care and reduce costs. We sought to determine whether an expanded MOA role in a rural practice was beneficial to patients and the practice.
Methods: We systematically evaluated the provision of diabetes care as measured by key indicators, patient and provider satisfaction, and use of health care services.
Results: Involvement by MOAs improved adherence to selected aspects of guideline-based care, and patient and provider satisfaction was high. The actual outcomes of the surrogate markers measured in care and downstream use of acute care services appeared to be unchanged during this study.
Conclusion: Use of MOAs to help provide team-based diabetes care in family practice resulted in improved performance of key indicators for diabetes care.

Introduction : Les soins aux personnes atteintes de diabète au Canada sont habituellement fournis par des pratiques de médecine familiale qui ne disposent pas nécessairement d'infirmières pour dispenser les soins proactifs planifiés recommandés par les lignes directrices. Le recours aux adjointes de bureau médical (ABM) pour effectuer des tâches clés en soin du diabète peut améliorer l'efficacité des soins et réduire les coûts. Nous avons cherché à déterminer si un rôle élargi pour les ABM dans une pratique rurale était bénéfique pour les patients et la pratique.
Méthodes : Nous avons évalué systématiquement la prestation de soins aux personnes atteintes de diabète telle que mesurée par des indicateurs clés, par la satisfaction des patients et des fournisseurs et par l'utilisation des services de santé.
Résultats : L'intervention des ABM a amélioré l'observation de certains aspects des soins basés sur les lignes directrices, et la satisfaction des patients et des fournisseurs était élevée. Les résultats concrets au niveau des marqueurs substituts mesurés pour les soins et l'utilisation en aval des services de soins actifs n'ont pas semblé changer au cours de l'étude.
Conclusion : Le recours aux ABM pour aider à fournir les soins du diabète en équipe dans une pratique de médecine familiale a amélioré le rendement d'indicateurs clés en soin du diabète.

INTRODUCTION

Given the major burden of diabetes in Canada, it is vital to improve health outcomes through improved care.[1–7] Diabetes care in Canada is largely provided by family doctors.[5,6] In a busy family practice, following guidelines and providing optimal planned, proactive care is difficult.[5–9] Although health care provided by teams has been proven to decrease complications from diabetes,[2,6,7,10–13] traditional nurse-led teams may be inaccessible, particularly in rural areas. Rural practice thus poses particular challenges in implementing evidence-based diabetes care, and methods of addressing these obstacles to quality diabetes care are not well known.[14–16]

System redesign has been proposed to improve primary care management of chronic diseases like diabetes.[17–29] The

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Practice Support Program in British Columbia began in 2007 as a joint initiative between the British Columbia Medical Association and the BC Ministry of Health. It was intended to provide education and support for redesign of primary practice systems in both rural and urban settings. The Practice Support Program encourages physicians to adopt strategies for quality improvement in their offices and to delegate tasks to appropriate members of the health care team. This allows physicians more time for guideline-directed care of complex chronic conditions during regular appointments.[25,30,31]

Team-led diabetes care allows nurses, dieticians and diabetes educators to take on planning, measurement, data recording and patient education for self-management.[10,22,28–31] Rural access to these services may be limited: resources and health care professionals may be scarce, and fee-for-service family physicians may not be able to afford to employ nurses. However, all physician offices have office staff. A medical office assistant (MOA) is a staff member with clerical skills who typically answers telephones, organizes the front office and manages patient flow and records. Although some have attended a course to teach those tasks, they typically do not have specific skills related to health care. The Practice Support Program has encouraged family physicians to use their MOAs more effectively to support planned, proactive care. Less complex aspects of chronic disease management, such as recall, ordering laboratory tests and measuring vital signs can be capably carried out by MOAs after appropriate training. Such delegation has the potential to improve both efficiency and quality of care, because more information is then available at physician appointments.[30,31] British Columbia's Medical Services Plan has incentive fees for obtaining guideline-based measurements in patients with diabetes according to the Diabetes Patient Care Flow Sheet, based on the clinical practice guidelines of the Canadian Diabetes Association.[6,7] Delegation of tasks to office staff, done with physician guidance, helps in the completion of these measurements. This use of office staff can be funded using these incentive fees.

Our study was an in-practice analysis of a system redesign in a small group practice in Creston, BC. The impetus came in 2005 when a physician reviewed clinic diabetes care and found that only 37% of patients with diabetes in her practice had undergone a glycosylated hemoglobin (HbA_{1c}) test in the preceding 4 months. This was average[8,10] but not optimal care. In response to this in-house audit, changes were made. Over a 2-year period an electronic medical record (EMR) was implemented, a registry of patients with diabetes was created with automatic electronic reminders,[23,32] and an expanded MOA role was developed to support care for the patients in this group practice. We undertook this study to determine whether the expanded MOA role was beneficial to patients and the practice.[33,34] We hypothesized that offering patients with diabetes appointments with MOAs could improve delivery of high-quality, efficient diabetes care as measured by guideline-based care indicators, patient and provider satisfaction, and measures of health care use.

METHODS

Creston (population 5000, area population 12 000) is located 115 km from a regional hospital and 425 km from a tertiary hospital. Mountain roads make travel difficult, particularly in winter. The study took place within a clinic consisting of 3 full-time practices: 1 practice shared by 2 family physicians (practice 1, intervention) and 2 separate practices of 2 family physicians (practices 2 and 3, control). Early in the study, one of the full-time family physicians died unexpectedly; his practice was thereafter managed by different locum tenentes.

Patients with diabetes were identified using the search function of the clinic's EMR. Letters of invitation were sent to adult patients who were cognitively intact and able to attend clinic appointments. Letters were followed up by a telephone call within 4 weeks. After a full explanation of the study, respondents voluntarily signed informed consent.

The expanded MOA role involved an MOA seeing patients in separate 20-minute appointments for measurement of height, weight, body mass index (BMI), waist circumference and blood pressure; a screening diabetic foot examination; and ordering of routine laboratory tests as per the BC guideline for diabetes care.[7] Influenza and pneumococcal vaccine, emergency department visits and hospital admission were also noted. The intervention group (from practice 1) had been attending MOA visits 2 to 4 times a year for 2 years before the study began, and continued to attend as usual throughout the 12 months of the study. The control group (from practices 2 and 3) received only usual care from their family doctors until the 6-month point of the study, when they began attending MOA appointments. For the final 6 months of the study, all participants attended MOA appointments. Normal care from each family physician was available as usual at all times.

Appointments with MOAs were scheduled at 0, 3, 6, 9 and 12 months in the intervention group and at 6, 9 and 12 months in the control group. Data from the 2 groups, including physical and laboratory observations (e.g., weight, blood pressure, waist circumference, HbA_{1c}, metre calibration and lipid panel) were recorded at 0, 3, 6, 9 and 12 months. To prevent repetition of services, data in the patient record for 3 months preceding the study were used to compare the groups initially and were included in the data at 0 months. We compared the frequency of measurements in the 2 groups for the 6 months before the control group started MOA appointments (0–6 mo) and at 6, 9 and 12 months when all patients were receiving the same care. We hypothesized that the 2 groups would differ initially but would become more similar by the end of the study, based on assessment of these aspects of diabetes care.

We used qualitative surveys to measure patient and provider satisfaction. We measured use of health care by recording the number of office visits, emergency department visits and hospital inpatient days. Deaths and their causes were noted.

We used a 2-sample *t* test of means and the Mann–Whitney rank test (because the distribution of counts was strongly skewed). For numerical measures, the number of measures in the first part of the study (0–6 mo) was compared with the number of measures in the second part of the study (6–12 mo).

The University of British Columbia Ethics Review Board gave ethical approval for the study.

RESULTS

Practice 1 had 76 patients with diabetes, 55 (72%) of whom were women. Practices 2 and 3 had a total of 111 patients with diabetes, 45 (40%) of whom were women.

We recruited 100 patients. Four patients were later excluded from the study results: 3 did not attend appointments and 1 had impaired glucose tolerance, not diabetes. A total of 46 participants in the intervention group from practice 1 received care from both MOAs and family physicians throughout the study year. A total of 50 control participants from practices 2 and 3 received usual family physician care for the first 6 months of the study with MOA appointments added for the second 6 months. The participants in each group were similar to the total group of patients with diabetes in the practice they belonged to with respect to sex, age, number of days since last HbA_{1c} and blood pressure measurement, and the value of the last HbA_{1c} and blood pressure measurement. Thus, the participants fairly represented the total group of patients with diabetes in each practice (Table 1). Patient age in the control and intervention groups were not statistically different, with a mean age of 65 (± 12) years for the control group and 67 (± 12) years for the intervention group (*t* test $p = 0.6$). However, the 2 groups were significantly different with respect to sex; in the control group, 38% (19/50) were female, whereas in the intervention group, 70% (32/46) were female ($p = 0.002$). Patients in the intervention and control groups were also significantly different with respect

Table 1. Characteristics of participants and total groups of patients with diabetes in intervention and control practices at baseline

	Mean (SD)*			
	Intervention (practice 1)		Control (practices 2 and 3)	
Characteristic	Participants, *n* = 46	Total group, *n* = 76	Participants, *n* = 50	Total group, *n* = 111
Age, yr	67.0 (12.0)	66.4 (14.1)	65.0 (12.0)	65.3 (11.2)
Female, %	70	72	36	40
Time since last HbA_{1c} measurement, d	120.4 (104.3)	100.2 (83.0)	207.5 (231.3)	214.3 (231.6)
HbA_{1c} value, %	7.1 (1.0)	7.1 (1.1)	7.3 (1.5)	7.3 (1.5)
> 6 mo since HbA_{1c} measurement, no. (%)	5 (10.9)	7 (9.2)	19 (38.0)	44 (39.6)
Time since last BP measurement, d	77.5 (66.6)	72.4 (58.0)	138.2 (112.6)	153.9 (142.0)
Last systolic BP value	131.3 (15.6)	132.2 (16.7)	128.3 (17.8)	132.9 (16.9)
Last diastolic BP value	74.9 (8.5)	75.8 (8.4)	78.3 (8.7)	79.3 (8.7)
> 6 mo since last BP measurement, no. (%)	1 (2.2)	2 (2.6)	16 (32.0)	35 (31.5)

BP = blood pressure; HbA_{1c} = glycosylated hemoglobin; SD = standard deviation.
*Unless stated otherwise.

to the number of days since last HbA_{1c} and blood pressure measurement and diastolic blood pressure value. There was no significant difference in HbA_{1c} or systolic blood pressure value. Patients in the intervention group had measurements done significantly more recently (Table 2).

The frequency of some measurements increased with MOA involvement. During the first 6 months, significantly more participants in the intervention group than in the control group had a foot examination, meter calibration, pneumococcal vaccination, and measurement of blood pressure, weight, BMI, waist circumference and HbA_{1c}. No significant differences were seen with respect to frequency of eye examinations, flu vaccination, lipid panel or urine albumin to creatinine ratio (ACR) (Table 3). After the control group began MOA appointments in the second part of the study (6–12 mo), the frequency of all measures improved in both groups, with foot and eye examinations approaching optimal rates. Meter calibrations improved in frequency, but most patients in both groups had not had one by the study's end. All participants in each group had blood pressure, weight, BMI and HbA_{1c} measurements. Waist circumference measurements, lipid panel and urine ACR also approached optimal rates (Table 4). In the first part of the study, the intervention group had, on average, significantly more frequent assessments of blood pressure and HbA_{1c}. After both groups received MOA appointments, the differences in means were no longer significant.

Because the Mann–Whitney and the 2-sample *t* test of means showed very similar *p* values, only the 2-sample *t* test results are shown (Table 5). Although MOA involvement increased the frequency of assessments being done and recorded, there were no statistically or clinically significant differences in the numerical values of blood pressure, weight, BMI, lipid panel results, or urine ACR measures in either group during the study. Too few waist circumference measurements

Table 2. Comparison of participants and total groups of patients with diabetes in intervention and control groups at baseline

	Mean (SD)*						
	Intervention			Control			Participants: intervention v. control, *p* value
Variable	Participants	Total group	*p* value	Participants	Total group	*p* value	
Time since last HbA_{1c} measurement, d	118.9 (105.0)	100.2 (83.0)	0.2	207.5 (231.3)	214.3 (231.6)	0.9	0.02
HbA_{1c} value, %	7.1 (1.0)	7.1 (1.1)	0.7	7.3 (1.5)	7.3 (1.5)	> 0.9	0.4
Time since last BP measurement, d	75.9 (66.4)	72.4 (58.0)	0.7	138.2 (112.3)	153.9 (142.0)	0.5	0.002
Last systolic BP value	131.2 (15.7)	132.2 (16.7)	0.8	128.3 (17.8)	132.9 (16.8)	0.1	0.4
Last diastolic BP value	74.8 (8.6)	75.8 (8.4)	0.6	78.3 (8.7)	79.3 (8.7)	0.5	0.06

BP = blood pressure; HbA_{1c} = glycosylated hemoglobin; SD = standard deviation.
*Unless stated otherwise.

Table 3. Performance of guideline-recommended tasks during the first part of the study (0–6 mo)

	% (no.) of participants			
Task	Intervention, *n* = 46	Control, *n* = 50	*p* value	95% CI for difference (intervention – control), %
Foot exam	61 (28)	0 (0)	< 0.001	46 to 74
Eye exam	54 (25)	56 (28)	0.9	–21 to 18
Influenza vaccination	67 (31)	60 (30)	0.4	–12 to 26
Pneumococcal vaccination	74 (34)	40 (20)	< 0.001	14 to 51
Meter calibration	20 (9)	0 (0)	0.001	11 to 33
BP measurement	100 (46)	82 (41)	0.003	10 to 31
Weight and BMI measurement	98 (45)	60 (30)	< 0.001	24 to 52
Waist circumference measurement	65 (30)	0 (0)	< 0.001	51 to 77
HbA_{1c} ordered	100 (46)	78 (39)	0.001	13 to 35
Lipid panel ordered	70 (32)	60 (30)	0.3	–10 to 28
Urine ACR ordered	50 (23)	54 (27)	0.7	–23 to 16

ACR = albumin to creatinine ratio; BMI = body mass index; BP = blood pressure; CI = confidence interval; HbA_{1c} = glycosylated hemoglobin.

were performed in the control group for comparison.

The mean number of physician appointments in each period (0–6 mo and 6–12 mo) and during the entire study duration did not differ significantly between groups (Table 6). The control and intervention groups were also similar in the percentage of patients who had any emergency department visits or inpatient days in hospital, with no differences at any of the time points (Table 7).

Five participants died during the study period, 2 in the control group and 3 in the intervention group. One from each group died from diabetes complications: pneumonia/chronic kidney disease (1), cerebrovascular accident (1). The other deaths were from malignancies (2) and alcoholic liver disease/gastrointestinal bleed (1). No statistical inferences could be made.

Physician responses to surveys at the beginning and end of the study indicated that all physicians thought diabetes care could be improved in the clinic. At the completion of the study, 2 physicians commented that they appreciated the increased communication from MOAs who saw patients.

Interactions with MOAs were well accepted by patients. The electronic reminder system alerted office

Table 4. Performance of guideline-recommended tasks at any time during the study

Task	% (no.) of participants		*p* value	95% CI for difference (intervention – control), %
	Intervention, *n* = 46	Control, *n* = 50		
Foot exam	87 (40)	88 (44)	0.9	–15 to 13
Eye exam	85 (39)	90 (45)	0.4	–20 to 8
Influenza vaccination	74 (34)	66 (33)	0.4	–11 to 26
Pneumococcal vaccination	78 (36)	48 (24)	0.001	11 to 47
Meter calibration	57 (26)	24 (12)	0.001	13 to 50
BP measurement	100 (46)	100 (50)	> 0.9	–8 to 7
Weight and BMI measurement	100 (46)	100 (50)	> 0.9	–8 to 7
Waist circumference measurement	80 (37)	86 (43)	0.5	–21 to 10
HbA_{1C} ordered	100 (46)	100 (50)	> 0.9	–8 to 7
Lipid panel ordered	98 (45)	96 (47)	0.6	–6 to 14
Urine ACR ordered	94 (43)	94 (47)	0.9	–12 to 11

ACR = albumin to creatinine ratio; BMI = body mass index; BP = blood pressure; CI = confidence interval; HbA_{1C} = glycosylated hemoglobin.

Table 5. Frequency of blood pressure and glycosylated hemoglobin measurement in the first part (0–6 mo) and second part (6–12 mo) of the study

Measurement; study period	No. of measurements, mean (SD)		*p* value
	Intervention*	Control	
BP: 0–6 mo	3.41 (2.78)	2.16 (1.98)	0.01
BP: 6–12 mo	4.91 (3.69)	3.92 (2.56)	0.1
HbA_{1C}: 0–6 mo	2.02 (0.80)	1.30 (0.91)	< 0.001
HbA_{1C}: 6–12 mo	2.72 (1.21)	2.32 (1.17)	0.1

BP = blood pressure; HbA_{1C} = glycosylated hemoglobin; SD = standard deviation.
*The intervention group had statistically more BP and HbA_{1C} measurements during the first part of the study. This significance was lost after appointments with medical office assistants were started for the control group.

Table 6. Frequency of physician appointments in the first part (0–6 mo) and second part (6–12 mo) of the study

Study period	No. of appointments, mean (SD)		*p* value
	Intervention	Control	
0–6 mo	7.26 (5.39)	7.64 (5.95)	0.8
6–12 mo	9.41 (7.68)	7.74 (7.61)	0.3
0–12 mo	16.67 (12.50)	15.38 (16.67)	0.6

SD = standard deviation.

Table 7. Hospital use at any time during the study

Hospital use	Group; % (no.) of participants		*p* value
	Intervention, *n* = 46	Control, *n* = 50	
Any visits to local ED	50 (23)	56 (28)	0.6
Any visits to other ED	6 (3)	6 (3)	0.9
Any days in hospital	20 (9)	32 (16)	0.2

ED = emergency department.

staff to call patients in for an MOA appointment when diabetes care was due. Acute problems were not dealt with during MOA appointments, and the tests recommended to monitor patients' progress received the necessary priority. Results of these measurements were then available for the physician at the follow-up appointment to aid medical management.

Patient satisfaction surveys showed that patients in both groups were satisfied with their care before and after MOA appointments were initiated, as rated on a numerical scale. Patient comments about the program were largely positive and included descriptions of MOAs as "friendly," "helpful," "sensitive," "caring," "supportive," "good at making sure I get regular laboratory work done" and "keeping a close eye on my feet." The most common comment thread in both groups both at the beginning and the end of the study was, "Overall, I would not change anything about the care I am receiving." Most patients enjoyed the involvement of the MOAs, but some were satisfied without it. Two patients commented, "Enjoy the staff but my doctor does a good job of looking after my diabetes on his own."

DISCUSSION

Clinical practice guidelines are intended to systematize, standardize and improve complex clinical tasks and streamline management. The guidelines of the Canadian Diabetes Association and the BC Ministry of Health–British Columbia Medical Association recommend optimal specific measurement intervals and indicator values for key markers known to improve diabetes outcomes.[2,6,7] For complex reasons, many patients with diabetes do not receive the recommended frequency of clinical measurement or laboratory testing.[2,6,8,9] During a traditional office visit, priorities must be set, and physicians are trained to respond to the patient's clinical concerns or priorities, which may result in decisions about chronic conditions being postponed while acute conditions are attended to.[12,21,35,36] Developing and organizing planned, proactive care for chronic health conditions requires a major shift in a physician's focus in the examination room because it involves performing clerical tasks and clinical measurements that may not be a priority for the patient at that time. Rural physicians, who are both highly trained and constrained for time, are a resource that is poorly invested in performance of these important but simple tasks. Recalling patients to the physician simply for ordering tests and performing guideline recommendations can result in longer waiting lists for appointments.

Team-based care offers an opportunity to address some of these challenges.[2,6,7,10,12,13,15,25,26,28,33] To meet this need, the role of MOAs in our clinic was expanded to enhance diabetes care. Medical office staff already have a relationship with the patients they see and are often trusted members of the care team as the first contact for patients reaching out for medical care. The use of MOAs to assist in team-based care required freeing time from the other myriad duties they perform on a regular basis. This was made possible by improving office efficiencies and using less experienced staff for less complex tasks, allowing the most capable MOAs to expand their role to be part of the diabetes care team.

How can the improvements resulting from a system change like MOAs be assessed? Guidelines recommend an ideal frequency of measures known to aid in diabetes management. If the performance of routine blood tests and measurement of vital signs at recommended frequency is considered improved care, then the MOA appointments improved care substantially because all participants had more frequent measurements with MOA involvement. It is accepted that good diabetes management cannot occur without adequate measurement, which should positively affect the treatment process and eventually result in improved outcomes.[2,6,7] However, even when results of measurements such as HbA_{1c} and blood pressure are available, the phenomenon of clinical inertia means that clinicians may not take appropriate action to lower abnormal readings. Appropriate action cannot be taken if measurements have not been done, but appropriate action is often not taken even when the physician is aware that results are suboptimal. The best way to influence physician management is uncertain and needs further study.[34–40]

Appointments with MOAs did not appear to affect diabetes control or use of acute care services during this study. The appointments did have a positive effect on office organization and patient and physician experience within this small group practice.

Training and use of existing office staff to track results, manage clerical details, and provide time to obtain diabetic measurements is a practical system change to improve measurement and information gathering within a rural family practice. Much research has been done on system redesign for improved diabetes care, both in terms of broad-spectrum change within health regions and smaller system changes. Large system redesign programs imposed by external influences may be unsustainable over time as competing clinical priorities come and go. Sustainable small system changes are often

untested. This study considers those issues in actual practice, and the results are positive enough to continue. Momentum for quality improvement and system redesign in family practice requires ongoing time, energy, support and funding. Current fee-for-service payment models require physicians to be creative and efficient in how they use their staff time and resources. Movement toward different funding models to support use of office personnel for appropriate tasks has the potential to improve the quality of diabetes care in rural practices.

Limitations

One practice involved in this study was managed by several locum tenentes for the year, with considerable variability in care. The intervention and control groups differed significantly in patient sex, possibly owing to the sex of the physicians (practice 1 was shared by 2 female physicians, and practices 2 and 3 had male physicians).[41] It was not possible to measure what effects these factors had on the results. In addition, this study did not measure the opportunity costs of diverting MOA time (at $20/h) to providing diabetes care, and conversely, the economic and clinical benefits of supporting physicians to use their time for tasks other than measuring and recording diabetes markers. Care by MOAs resulted in increased frequency of diabetic measurement, such as HbA_{1c} and blood pressure. The frequency of measures is a surrogate marker for better-organized care, long thought to mean higher-quality diabetes management.[36–40] Appropriate physician reaction to an abnormal result with patient recall, a change in therapy and a follow-up plan would indicate a better marker for improved care.[38] Improvement in intermediate markers such as HbA_{1c} and blood pressure values may have been seen if the study had continued longer, with decreased long-term diabetes complications the eventual result. A crossover study with a larger sample over a longer period would have given more data.

CONCLUSION

This study's aim was to evaluate the benefits of a system change in a rural family practice. The results show that inclusion of MOAs in the diabetes care team improved the frequency of measurements recommended by guidelines for diabetes care.

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CORRECTION

In the article "Industrial wind turbines and adverse health effects," reference 41 should be "Correspondence from the Honourable Rona Ambrose. June 30, 2009."

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