

Do rural patients benefit from visits to an urban diabetes teaching centre?

A recent study suggests that whether patients are managed locally or sent to a diabetes program in a larger community, their diabetes-related outcomes are similar.

ABSTRACT: *Background:* A retrospective chart review was undertaken to determine whether rural diabetics attending diabetes teaching centres have better blood sugar control and better diabetes-related outcomes compared with diabetics receiving local care only.

Methods: The study population consisted of people living in the Bella Coola Valley and having a chart at the Bella Coola Medical Clinic. The charts of these individuals were reviewed for date of diagnosis and duration of diabetes, and for measurements over time of weight, systolic blood pressure, diastolic blood pressure, cholesterol, triglyceride, and glycosylated hemoglobin levels.

Results: A comparison of diabetics who attended a diabetes teaching centre with those who did not attend reveals attendance did not result in any greater lowering of weight, systolic blood pressure, diastolic blood pressure, cholesterol, triglyceride, or glycosylated hemoglobin levels. None of the outcome variables were significantly associated with the number of visits to a diabetes teaching centre either. Thus, it does not

appear that weight, systolic blood pressure, diastolic blood pressure, cholesterol, triglyceride, or glycosylated hemoglobin levels are lowered with more frequent visits to a diabetes teaching centre.

Conclusion: The occasional visit to diabetes teaching centres by predominantly aboriginal diabetics was not associated with improved outcomes over and above those seen by diabetics who received closer to home conventional treatment.

Background

Diabetes mellitus is an important cause of death, illness, and disability across Canada. It affects approximately 5% of adults, which means more than 1 million Canadians.^{1,2}

Having diabetes substantially increases one's risk of developing blindness and end-stage renal disease, requiring lower limb amputations, and dying from coronary artery disease, stroke, or peripheral vascular disease.^{3,4} Recent studies have shown that keeping blood sugar levels within the normal range reduces the chance of developing some of the complications associated with having diabetes.⁵⁻⁷

Thus, an important aspect of type 2 diabetes treatment is lowering blood sugar levels through diet, exercise, and medications.⁸⁻¹² Comprehensive management of diabetic patients also includes managing blood pressure and lipids, encouraging smoking cessation, and prescribing the prophylactic use of acetylsalicylic acid.² According to practice guidelines, initial and ongoing education of the patient with diabetes should be an integral part of diabetes management and not merely an adjunct to treatment. Whenever possible, diabetic patients should receive dietary advice from a registered dietitian.^{1,2,13}

Diabetes teaching centres (DTCs), also known as diabetes education cen-

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tres, are being set up across Canada to provide diabetics with comprehensive, up-to-date medical treatment. In British Columbia, there are approximately 80 fully accredited DTCs that provide education and support to people with diabetes, their families, and their friends.¹⁴ These DTCs are staffed by nurses and dietitians, as well as physicians and other health professionals.^{15,16}

Isolated rural communities lack the full range of health professionals

there is a need to develop comprehensive, rural-oriented diabetes treatment programs. Before such programs can be developed, however, health care administrators will probably want to know the answers to the following questions:

1. Do rural diabetics really have poorer blood sugar outcomes than urban diabetics?

2. Do rural diabetics who attend a diabetes teaching centre have better outcomes (e.g., blood sugar control,

blood sugar outcomes than urban diabetics.

In an attempt to answer the second question, we undertook a retrospective chart review to determine whether Bella Coola diabetics attending urban DTCs on occasion have better diabetes-related outcomes than Bella Coola diabetics who have never attended a DTC.

Methods

Bella Coola Valley is a remote community located in the central coast region of British Columbia. The isolation of this community means that almost everyone who lives in the Bella Coola Valley has either a clinic chart or an emergency room record. This makes Bella Coola Valley an ideal community for studies of population-based and visit-related issues. Details of the medical services available in this community have previously been reported.²² According to the 2001 census, 2285 people live in the Bella Coola Valley, and 46% of these people are of aboriginal descent.^{23,24} Bella Coola Valley is part of the traditional territory of the Nuxalk Nation, a tribe of Salish-speaking Coastal Indians.²⁵⁻²⁷

This research project was carried out in a participatory fashion, following the recommendations outlined in a recently published policy statement.²⁸⁻³⁰ There was consultation with the Nuxalk Band Council, community members, and local health care providers on our plans to study determinants of health and disease of people living in the Bella Coola Valley. Prior to collecting data we obtained letters of support from the Nuxalk Band Council, from the Bella Coola Transitional Health Authority, and from Central Coast Regional District. Ethics approval was obtained from the research ethics committees at both the University of British Columbia and the University of Northern British

Newly diagnosed diabetics living in an urban locality see a physician more frequently, are more likely to be admitted to hospital, and are referred to specialists more frequently than rural diabetics.

(e.g., dietitians) required to run an accredited DTC.¹⁴ Compared with their urban diabetic counterparts, rural diabetics must travel greater distances, spend more money, and make greater time commitments if they wish to see a diabetes specialist or attend a DTC.¹⁷ Many diabetics decide they simply cannot afford it, and they stay home and make do. Studies confirm that newly diagnosed diabetics living in an urban locality see a physician more frequently, are more likely to be admitted to hospital, and are referred to specialists more frequently than rural diabetics.^{14,18} Rural diabetics are also more likely to receive diabetic care from health care providers other than physicians.^{14,19,20}

If rural diabetics are to have the same opportunities as urban diabetics,

lower blood pressure, and lower cholesterol levels) than rural diabetics who do not attend a DTC?

Regarding the first question, we recently compared diabetics living in the isolated rural community of Bella Coola Valley with diabetics attending an urban family practice clinic in Vancouver. Bella Coola diabetics had more clinic-based diabetes education and fewer referrals to DTCs and endocrinologists than their Vancouver counterparts.²¹ Interestingly, there was no difference in mean glycosylated hemoglobin (hemoglobin A1c or HbA1c) values between the Bella Coola and Vancouver diabetics; and both groups had about the same proportion of diabetics on insulin. Thus, it would appear that rural diabetics do not have poorer

Columbia. Nuxalk health authorities reviewed the final manuscript and approved it for publication.

In the spring of 2002, all clinic charts located in the Bella Coola Medical Clinic were reviewed to identify patients who had diabetes. The diagnostic criteria used was based on the 1998 clinical practice guidelines for the management of diabetes in Canada³¹ and the recommendations of the expert committee on the diagnosis and classification of diabetes mellitus.¹ After the diabetic population was defined, the patients' charts were carefully reviewed in the summer and fall of 2002 for the following information:

- Date of diagnosis and duration of diabetes in years.
- Blood glucose and hemoglobin A1c levels over time.
- Weight over time.
- Cholesterol and blood pressure values over time.
- Whether the patient received diabetes education, attended a diabetes teaching centre, saw an internist, or saw a dietitian.

Information derived from the charts was entered into an Excel spreadsheet from which results were summarized, graphs created, and the data sent to statisticians and other researchers for further analyses.³² The data were analyzed using SPSS software. Significance was

Table 1. Visits made by Bella Coola Valley patients to a diabetes teaching centre (DTC).

Number of visits to DTC	Aboriginal patients	Nonaboriginal patients	All patients
0	28	51	79
1	11	3	14
2	11	1	12
3	7	0	7
4	7	1	8
5	4	0	4
6	2	0	2
8	1	0	1

defined as $P \leq .05$ for each outcome measure.³³

Mean change in outcome measurements (weight, systolic blood pressure, diastolic blood pressure, cholesterol, triglyceride, and hemoglobin A1c) over the 15-year follow-up period was first calculated. The difference between the initial measurements (time 0) and final measurements (mean of time 0.5–15.0 years) for each outcome measure was then compared using a *t* test analysis. The data were analyzed separately for two groups of interest: (1) aboriginal and nonaboriginal diabetics; (2) diabetics attending centres and those not attending. ANOVA analysis was then performed to see whether any of the outcomes were significantly different across the two groups.

Results

There are 127 known diabetics living in the Bella Coola Valley. Of these, 71 are aboriginal and 56 are nonaboriginal. Typically, a nurse practitioner sees the patient after the diagnosis of diabetes has been made in the Bella Coola Valley and recommends a diet, exercise, and weight management plan. The Bella Coola physician initiates treatment, and then monitors the patient to ensure that recommended diabetes monitoring guidelines are being followed. All diabetics living in the Bella Coola Valley are given the opportunity to attend a DTC. Some have attended, others have not.

Table 1 shows how many times diabetic patients from Bella Coola attended a DTC over the 15 years studied.

Among the 79 diabetics who *did not* attend a DTC, there was a signifi-

Table 2. *t* test statistics on initial versus 15-year mean value.

	Did not attend clinic			Attended clinic		
	Initial value	Mean value (0.5–15.0 years)	Significance (<i>P</i>)	Initial value	Mean value (0.5–15.0 years)	Significance (<i>P</i>)
Weight	95.81	93.23	.005	102.32	98.16	.002
SBP	146.32	145.54	.652	132.58	136.26	.108
DBP	82.57	81.96	.570	81.71	79.03	.100
Cholesterol	5.62	5.04	.000	5.73	5.04	.010
Triglyceride	3.03	2.45	.003	4.49	2.62	.101
HbA1c	0.08	0.07	.000	0.90	0.84	.039

cant decrease in weight, cholesterol, triglyceride, and hemoglobin A1c levels over the 15 years studied. Among the 48 diabetics who *did* attend a DTC, there was also a significant decrease in weight, cholesterol, and hemoglobin A1c levels over the 15 years studied (Table 2).

ANOVA analysis reveals that none of the outcomes were significantly different across the two groups (Table 3). In other words, those who attended a DTC did not exhibit any significant differences from those who did not attend a DTC over the study period. Therefore, attending a DTC does not appear to have an additional positive effect on lowering weight, lowering systolic blood pressure, lowering diastolic blood pressure, lowering cholesterol, lowering triglyceride, or lowering hemoglobin A1c levels for diabetics over the long term. Similarly, none of the outcome variables were significantly associated with the number of visits to a DTC. Thus, it does not appear that weight, systolic blood pressure, diastolic blood pressure, cholesterol, triglyceride, or hemoglobin A1c levels decrease further with more frequent visits to a DTC.

Conclusion

Our results suggest that attending an urban diabetes teaching centre did not result in any additional beneficial changes in outcome variables (weight, systolic blood pressure, diastolic blood pressure, cholesterol, triglyceride, or glycosylated hemoglobin levels). Our results also suggest that none of the outcome variables were significantly associated with the number of visits to a DTC. Inability to prove a beneficial effect from attending a DTC once or several times does not mean patients who attended did not find it worthwhile. A qualitative study involving Nuxalk diabetics who

Table 3. ANOVA statistics on clinic attendees and nonattendees.

	Mean difference nonattendees	Mean difference attendees	F test score	Significance (P)
Weight	2.58	4.15	1.104	.296
SBP	0.78	-3.67	2.498	.117
DBP	0.61	2.68	1.255	.265
Cholesterol	0.57	0.70	0.210	.648
Triglyceride	0.58	1.87	1.842	.177
HbA1c	0.01	0.01	1.688	.196

Local health professionals should be encouraged to pursue their plans to develop locally based, culturally relevant, diet, exercise, and diabetes prevention and management programs.

had attended an urban DTC revealed that all felt it was a useful experience, that the sessions were informative, and that they learned a lot about medication, diet, and exercise.³⁴ However, because we were unable to demonstrate statistically significant outcomes, local health professionals should be encouraged to pursue their plans to develop locally based, culturally relevant, diet, exercise, and diabetes prevention and management programs. Preferably this should be done in consultation with diabetes specialists who attend the urban DTCs so that the latest in information can be quickly made available to this isolated rural community.

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Competing interests

None declared.

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