ORIGINAL RESEARCH

Exposure to Alternative Healthcare Providers and Adherence to Guidelines among Patients with Diabetes

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ABSTRACT

OBJECTIVES: Diabetes is increasing in prevalence across Canada. In the continuously evolving primary care landscape, practitioners from varied training paths are claiming rights to care for patients, including those with diabetes. Little is known about patient exposure to complementary and alternative medicine (CAM) providers, or about such providers' use of guideline-based monitoring and treatment recommendations. The purpose of this study was to examine compliance with 4 recommendations (influenza vaccination, eye examination, glycated hemoglobin measurement and foot exam) by patients with diabetes who use CAM providers compared to those who exclusively use primary care physicians.

METHODS: We analyzed data on 7209 patients with diabetes using the Canadian Community Health Survey. Patients with exposure to CAM providers were compared with individuals who were exposed to a family physician only. Multivariate logistic regression was conducted adjusted for age, sex, duration of diabetes, insulin/oral antihyperglycemic agent use and education.

RESULTS: Approximately 4% of persons had been exposed to CAM providers in the preceding year. The odds ratio for receiving influenza vaccination among those exposed to a CAM provider was 0.94 (95% CI 0.74–1.17). The odds ratios for eye examinations in the preceding 24 months, and for foot examinations and glycated hemoglobin tests in the preceding 12 months were 1.02 (95% CI 0.69–1.48), 1.18 (0.83–1.67) and 1.09 (95% CI 0.71–1.66), respectively.

CONCLUSION: Our results did not show statistical significance in any of the 4 outcomes analyzed. This study supports others suggesting that persons using CAM providers do so to complement traditional medical care, rather than as an alternative to such care.

KEYWORDS: adherence, alternative medicine, complementary medicine, diabetes, guidelines

RÉSUMÉ

OBJECTIFS : La prévalence du diabète est en hausse partout au Canada. Dans le contexte en constante évolution des soins primaires, des praticiens ayant des formations diverses revendiquent le droit de traiter les patients, y compris ceux qui souffrent de diabète. On sait peu de choses sur l'exposition des patients aux praticiens de la médecine complémentaire et douce (MCD) et sur l'usage que font ces praticiens des recommandations en matière de surveillance et de traitement venant des lignes directrices. Cette étude visait à examiner la fidélité à quatre recommandations (vaccination antigrippale, examen de la vue, mesure de l'hémoglobine glyquée et examen des pieds) chez les patients diabétiques qui consultent des praticiens de la MCD par rapport à ceux qui consultent exclusivement des médecins de soins primaires.

MÉTHODES : Nous avons analysé les données sur 7209 patients diabétiques recueillies au moyen de l'Enquête sur la santé dans les collectivités canadiennes. Les patients qui consultaient un praticien de la MCD ont été comparés aux patients qui ne consultaient qu'un médecin de famille. On a effectué une régression logistique multivariée avec ajustement en fonction de l'âge, du sexe, de l'ancienneté du diabète, de la prise d'insuline/d'un antihyperglycémiant oral et de l'éducation.

RÉSULTATS : Environ 4 % des sujets avaient consulté un praticien de la MCD au cours de l'année précédente. Le rapport de cotes pour la vaccination antigrippale chez les sujets qui avaient consulté un praticien de la MCD était de 0,94 (IC de 95 % de 0,74 à 1,17). Les rapports de cotes pour l'examen de la vue au cours des 24 mois précédents et pour l'examen des pieds et la mesure de l'hémoglobine glyquée au cours des

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12 mois précédents étaient respectivement de 1,02 (IC de 95 % de 0,69 à 1,48), 1,18 (IC de 95 % de 0,83 à 1,67) et 1,09 (IC de 95 % de 0,71 à 1,66).

CONCLUSION : Nos résultats n'ont été statistiquement significatifs pour aucun des quatre paramètres analysés. La présente étude donne à penser, comme d'autres études, que les personnes qui consultent un praticien de la MCD considèrent la MCD comme un complément et non comme un substitut aux soins médicaux traditionnels.

MOTS CLÉS : fidélité, médecine parallèle, médecine complémentaire, diabète, lignes directrices

INTRODUCTION

Diabetes is becoming increasingly prevalent in Canada (1), currently affecting 6.2% of the population (2). Patients with this chronic disease are at risk for increased mortality and morbidity: diabetes is the leading cause of blindness, renal failure and non-traumatic amputation, and is associated with high rates of cardiovascular disease and depression (3). A great deal of research has been aimed at decreasing diabetes-related complication rates and mortality, and this, in turn, has led to the development of guidelines to promote evidence-based monitoring and treatment.

The use of complementary and alternative medicine (CAM) therapies in Canada is common, with approximately 75% of Canadians reporting its use (4). In 2006, Canadians collectively spent approximately Can $5.6 billion on CAM (an increase from $2.8 billion in 1997) (4). Seeking healthcare from a CAM provider is less common among people with diabetes, but approximately 8% of Canadians with diabetes do so (5).

The face of primary care in Canada is an evolving landscape, and in addition to conventional family physicians, practitioners from numerous other streams of training now claim rights to this role. For example, naturopathic medicine has recently succeeded in its petition for prescription privileges, which naturopaths deemed necessary to provide comprehensive primary care (6). Patients may now elect to see a CAM practitioner for an increasing proportion—or even all—of their primary healthcare needs. It is uncertain to what extent the care of diabetes, as recommended by the Canadian Diabetes Association (3), will be affected by these developments. Both Canadian policy makers and patients must be aware of the potential ramifications of such changes when making decisions about diabetes care.

This study focuses on those providing services for primary healthcare needs; specifically, naturopathic doctors and practitioners of homeopathy and Chinese traditional medicine/acupuncture. Naturopathic medicine is practiced by those with a 4 year doctor of naturopathic medicine degree (7), and legislation facilitating the practice of naturopathy exists in British Columbia, Saskatchewan, Manitoba, Ontario and Nova Scotia. Practitioners of homeopathy, Chinese traditional medicine and acupuncture have varied levels of training; currently, government legislation to enable regulation exists in British Columbia for Chinese medicine and has recently been created in Ontario for Chinese medicine and homeopathy (8,9). Other fields of alternative medicine that provide consultation for primary care are not regulated in Canada, nor is training uniform. No CAM providers are eligible to bill the provincial public medical systems for services, but there is provision of these services through private health plans.

A recent study using the United States National Health Interview Survey examined preventative care in patients with diabetes who had exposure to CAM therapies (10) and found that patients who used CAM were more likely to receive a pneumococcal vaccination and visit their primary care physician 6 or more times per year. The study suggested that the use of CAM therapies was more "complementary" and less "alternative." Currently, no research has been conducted exploring the influence of CAM providers (naturopathic doctors, homeopaths and other alternative healthcare providers) on patient adherence to conventional guideline-based medical recommendations. The purpose of this study was to use the Canadian Community Health Survey to examine compliance with several guideline-based recommendations (influenza vaccination, eye examination, glycated hemoglobin [A1C] measurement and foot exam) by patients with diabetes who use CAM providers compared to those who only visit primary care physicians.

METHODS

Data sources

The Canadian Community Health Survey (CCHS) Cycle 3.1, conducted between January and December of 2005, was used in this study. The CCHS is administered by Statistics Canada and is described in detail elsewhere (11). Briefly, the cross-sectional survey is used to collect data related to health status, use and determinants in the Canadian population, sampling individuals >12 years of age and living in private dwellings in the 10 provinces and 3 territories of Canada. Individuals are excluded if they live in an institution, on a First Nations reservation, on government-owned land or in certain remote regions. The CCHS includes responses from 132 221 Canadians from 125 health regions and is representative of approximately 98% of the Canadian population older than 12 years of age.

Study sample

A sample of patients with diabetes was created from the survey results in whom the 2003 Canadian Diabetes

Association guidelines would be applicable for the following 4 outcomes: influenza vaccinations, eye examinations, A1C measurements and foot examinations (3). Because the CCHS did not distinguish between types of diabetes (type 1 vs. type 2), patients were defined as having type 2 diabetes if their age at diagnosis was >25 years. Individuals younger than 25 years at diagnosis were included if their duration of disease was ≥5 years. The rationale for these criteria was based on guidelines suggesting the initiation of diabetes complication surveillance upon diagnosis in type 2 diabetes and at 5 years after diagnosis in type 1 diabetes (3). The 3 outcomes of eye examination, A1C testing and foot examination were determined only for those patients selected to receive the diabetes care module (a portion of the survey given to a subset of the sample—in this case approximately 50% of all patients with diabetes). Therefore, 2 samples were created for this study: Sample 1 included all eligible patients with diabetes; Sample 2 included only eligible patients with diabetes who received the diabetes care module.

Exposures

All persons who received the survey were questioned about their exposure to an array of healthcare providers, including family physicians, medical consultants, nurses, chiropractors and a variety of alternative healthcare providers, such as homeopaths, naturopaths, herbalists and acupuncturists. Within the study samples, persons were divided into 2 mutually exclusive groups. The first group (control) was the family physician-exposed group; individuals in this group had seen a family physician at least once in the preceding 12 months and had no exposure to an alternative healthcare provider over the same time period. The second group (exposed) consisted of those who had been exposed to a CAM provider for their own health in the previous 12 months. Our definition of a CAM provider included the following 3 specific categories: naturopath or homeopath; acupuncturist; and other. The "other" category included Feldenkrais or Alexander teacher, relaxation therapist, biofeedback teacher, Rolfer, herbalist, reflexologist, spiritual healer and religious healer. Individuals in the exposed group were not excluded if they had seen a family physician in the past year.

Outcomes

The Canadian Diabetes Association 2003 clinical practice guidelines (3), published prior to the survey, were reviewed for recommendations that could be applied to the sample. Four recommendations from these guidelines were assessed in the CCHS Cycle 3.1 survey. First, screening for retinopathy was recommended every 1 to 2 years in type 2 diabetes and annually in type 1 diabetes. The CCHS survey asked respondents if they had attended an eye exam conducted by a health professional with pupil dilatation, and when this had last occurred. For simplicity, we defined an exam in the past 2 years as meeting guideline standards. The second outcome variable was an annual foot exam by a health professional. All those who had received a foot exam within the previous 12 months were considered to have met this standard. The third outcome variable was A1C measurement within the preceding year. The 2003 Canadian Diabetes Association guidelines recommend testing A1C every 3 to 6 months (3), but in this study we used 12 months as our standard, because this was the shortest interval measured in the CCHS. Finally, we determined receipt of an influenza vaccination within the previous 12 months, also in accordance with diabetes guidelines (3).

Statistical analysis

All analyses were weighted using probability weights (calculated from frequency weights provided by Statistics Canada) to account for the multistage stratified sampling methodology. The prevalence of each outcome was calculated for both the exposed and control groups, and the Student's t-test was used to compare covariates between groups. We used logistic regression to model the association between exposure to CAM providers and the likelihood of receiving each of the 4 guideline recommendations, calculating odds ratios to measure this association. Other variables entered as independent variables into the multivariate regression model included age, sex, duration of diabetes, use of insulin/oral antihyperglycemic agents and highest level of household education. All data were analyzed using SAS version 9.2 (SAS Institute, Carey, North Carolina).

RESULTS

A total of 8160 survey respondents identified themselves as having diabetes, of whom 7209 (88.3%) were included in Sample 1 (modelling the outcome of influenza vaccination) and 3510 (43.0%) were included in Sample 2 (modelling the outcomes of eye exam, A1C and foot exam). The overall prevalence of CAM provider exposure was 4.8% in Sample 1 and 3.8% in Sample 2. Patient characteristics are described in Table 1. On average, patients who saw CAM providers were younger, more likely to be on insulin therapy, less likely to be on oral agents and more likely to have attained postsecondary education. The duration of diabetes was similar between exposure groups. In both Sample 1 and Sample 2, 92% of individuals exposed to CAM had also seen a family physician in the preceding 12 months. The mean number of visits in the preceding 12 months was also similar between both exposures and samples (6.0 visits). In Sample 1, 68% had been immunized against influenza in the previous year. In Sample 2, the prevalence of eye and foot exams was 71% and 50%, respectively, while that of A1C measures was 77%.

Table 1. Weighted characteristics of Canadian Community Health Study sample with diabetes*

Sample 1: influenza vaccine outcome (n=7209)			
Characteristic	***FP exposure only (n=6861)***	***CAM exposure (n=348)***	***p value***
Mean age, y (±SD)	62.7 (12.1)	58.3 (12.9)	<0.0001
Female	2978 (43.8)	194 (52.8)	0.0008
Mean diabetes duration, y (±SD)	9.1 (10.2)	9.0 (9.8)	0.94
Insulin therapy	1204 (18)	83 (23)	0.02
Oral therapy	4856 (71)	225 (61)	<0.0001
Postsecondary education	2922 (43)	208 (57)	<0.0001
Sample 2: eye exam, foot exam and A1C outcomes (n=3510)			
Characteristic	***FP exposure only (n=3376)***	***CAM exposure (n=134)***	***p value***
Mean age, y (±SD)	63.2 (12.0)	57.1 (13.7)	<0.0001
Female	1727 (42.2)	82 (51.6)	0.02
Mean diabetes duration, y (±SD)	9.1 (9.7)	7.9 (9.1)	0.16
Insulin therapy	625 (18.7)	24 (24.2)	0.10
Oral therapy	2359 (71.6)	87 (60.2)	0.003
Postsecondary education	1262 (41.7)	74 (55.1)	0.001

*Due to weighting, the percentages do not correspond exactly to raw calculations. The weighted percentages are a better estimate of the population prevalence and are therefore reported here

Numbers are n (%), unless otherwise indicated

A1C = glycated hemoglobin
CAM = complementary and alternative medicine
FP = family physician

The final multivariate model was adjusted for the following variables: age, sex, duration of diabetes, oral antihyperglycemic agent use, insulin use and postsecondary education (Table 2). The odds of achieving any of the 4 outcomes of interest did not differ significantly between those exposed to CAM providers and those exposed to family physicians only. The odds ratio for receiving influenza vaccination in the preceding year among persons exposed to a CAM provider was 0.93 (95% CI 0.74–1.17). The odds ratios for eye examinations in the preceding 24 months and A1C testing and foot examinations in the preceding 12 months were 1.02 (95% CI 0.70 1.48), 1.18 (0.83–1.67) and 1.09 (95% CI 0.71–1.66), respectively.

In all 4 outcome models, several covariates significantly affected the outcomes (Table 2). Having achieved a postsecondary education was associated with 19% to 37% relative increased odds of outcomes. Exposure to either insulin or oral antihyperglycemic medications was also associated with substantial increases in outcomes, likely reflecting disease

Table 2. Crude and adjusted odds ratios of 4 guideline -based outcomes between persons exposed to CAM vs. those exposed to family physicians only

	Crude OR (95% CI)	***Adjusted OR (95% CI)***
Influenza vaccination		
CAM exposure (yes vs. no)	0.87 (0.70–1.09)	0.93 (0.74–1.17)
Age (y)	—	1.03 (1.03–1.04)
Sex (female vs. male)	—	1.11 (1.00–1.12)
Duration of diabetes (y)	—	1.01 (1.01–1.02)
Oral antihyperglycemic agent use (yes vs. no)	—	1.21 (1.07–1.36)
Insulin use (yes vs. no)	—	1.37 (1.17–1.60)
Postsecondary education (yes vs. no)	—	1.37 (1.12–1.53)
Eye exam in past 24 months		
CAM exposure (yes vs. no)	1.04 (0.72–1.50)	1.02 (0.70–1.48)
Age (y)	—	1.00 (0.99–1.01)
Sex (female vs. male)	—	1.12 (0.96–1.30)
Duration of diabetes (y)	—	1.03 (1.02–1.04)
Oral antihyperglycemic agent use (yes vs. no)	—	1.42 (1.20–1.69)
Insulin use (yes vs. no)	—	1.88 (1.43–2.39)
Postsecondary education (yes vs. no)	—	1.22 (1.05–1.42)
A1C in past 12 months		
CAM exposure (yes vs. no)	1.14 (0.75–1.72)	1.09 (0.71–1.66)
Age (y)	—	0.99 (0.98–1.00)
Sex (female vs. male)	—	0.83 (0.71–0.98)
Duration of diabetes (y)	—	1.02 (1.01–1.03)
Oral antihyperglycemic agent use (yes vs. no)	—	1.54 (1.27–1.85)
Insulin use (yes vs. no)	—	1.82 (1.40–2.36)
Postsecondary education (yes vs. no)	—	1.19 (1.00–1.85)
Foot exam in past 12 months		
CAM exposure (yes vs. no)	1.16 (0.83–1.63)	1.18 (0.83–1.67)
Age (y)	—	1.01 (1.00–1.01)
Sex (female vs. male)	—	0.89 (0.77–1.02)
Duration of diabetes (y)	—	1.01 (1.00–1.02)
Oral antihyperglycemic agent use (yes vs. no)	—	1.41 (1.20–1.66)
Insulin use (yes vs. no)	—	2.64 (2.15–3.24)
Postsecondary education (yes vs. no)	—	1.23 (1.07–1.41)

A1C = glycated hemoglobin
CAM = complementary and alternative medicine

severity. The same association was found for duration of diabetes and age, also likely secondary to either actual or perceived severity of disease. The effect of sex was marginal for A1C testing within the preceding 12 months (reduced odds for females) and influenza vaccination in the preceding 12 months (increased odds).

DISCUSSION

To our knowledge, this is the first study to compare guideline-based monitoring and treatment recommendations among those exposed to CAM providers vs. those not exposed to such providers. Our results did not show statistical significance in any of the 4 outcomes analyzed, although eye examination, A1C and foot examination had slightly higher odds of occurrence, and influenza vaccination had lower odds of occurrence, in those exposed to CAM. While we were unable to rule out that important differences may still exist, it is unlikely that these differences would exceed an odds ratio of 30% to 60%. The relatively low prevalence of CAM provider exposure is the primary reason for the wide confidence intervals around our estimates.

This study differs from others in the definition of CAM providers used. Most notably, a recent Canadian study that used CCHS data and examined CAM provider use among patients with diabetes in Canada found a prevalence of approximately 8% (5). The prevalence in our study of 4.8% in Sample 1 and 3.8% in Sample 2 markedly differs. While the previous study included exposure to chiropractors and massage therapists, we excluded these providers on the grounds that they would be only rarely used in a treatment strategy for patients with diabetes, and they are widely no longer considered CAM. Furthermore, while many studies examine overall CAM use, we specifically examined exposure to CAM providers. It is highly likely that a significant amount of CAM use is in the absence of a CAM provider (i.e. primarily self-care).

Of significant importance to providers of care for patients with diabetes is the relatively low rate of the outcomes studied. Given the low prevalence of eye and foot examinations among patients who had contact with a family physician—only 71% and 50%, respectively—these guideline-based practices should share renewed focus among family physicians. Similarly, the relatively low prevalence of annual influenza vaccinations and high frequency of patients not having A1C measured is worth noting. Not surprisingly, individuals in the CAM provider group were more likely to have attained postsecondary education and to be female. This outcome has been observed both in CAM users in general, and more recently in CAM users with diabetes (7,12,13). Use of CAM therapies has also been found to be more prevalent among those aged 35 to 49, those with higher incomes and those with chronic health conditions (12). It was also the case in this study that having attained a higher level of education led to higher uptake of guideline-based recommendations.

This study has several limitations. First and most importantly, the cross-sectional nature of survey data limits our ability to draw causal inferences. Furthermore, we do not know the nature of the interactions between CAM providers and their patients, which may have been for reasons other than diabetes. The motivations and values of consulting CAM practitioners is also a source of limitation, as these characteristics may influence their uptake of conventional medical therapies, irrespective of their use of CAM therapies. As referenced above, much research has been done investigating the characteristics of those who pursue CAM techniques, but the intricacies of these relationships are beyond the scope of this study. Additionally, these differences likely preceded the measurement of the study outcomes, although we do recognize the speculation in such claims. A further limitation of this study is the possibility of a social desirability bias with respect to each of the outcomes. It may be that participants, in an attempt to please the interviewer, were dishonest about whether or not they had experienced the outcomes of interest. However, there is no reason to suspect that such bias would differ between exposed and non-exposed individuals. Finally, while the Canadian Diabetes Association 2008 clinical practice guidelines were the most recently published guidelines at the time of analysis, the recommendations used in this study were equivalent in both the 2003 and 2008 guidelines, suggesting that the practices assessed during the time of the 2005 survey remain relevant today.

The provision of primary care in Canada has the potential to see further change, with CAM providers pursuing more comprehensive roles in primary care and very recently obtaining further privileges in conventional medicine. Our study, using data from 2005, suggests that among patients with diabetes, CAM practitioners are providing complementary rather than alternative care. Further research on this important topic is needed to monitor these trends.

CONCLUSIONS

There were no statistical differences found in the odds of persons with diabetes exposed to CAM healthcare providers receiving guideline-based care with respect to influenza vaccinations, eye exams, A1C measurements and foot exams. This study lends support to others suggesting that persons using CAM providers do so to complement traditional medical care, rather than as an alternative to such care (10).

ACKNOWLEDGEMENTS

We would like to acknowledge Mieke Koehoorn, PhD, School of Population and Public Health, University of British Columbia, for her thoughtful review of the manuscript and statistical advice.

AUTHOR DISCLOSURES

This study was not funded. The authors have no conflicts of interest to declare. Dr. Wiens is supported by a fellowship from the Canadian Institutes of Health Research and receives research support from the Canadian Child Health Clinician Scientist Program.

AUTHOR CONTRIBUTIONS

MW conceived the study idea and conducted all analyses. MW and BG conducted background literature searches, wrote the manuscript and contributed to the discussion.

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