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COMPARING SELF-RATED HEALTH, SATISFACTION AND QUALITY OF LIFE SCORES BETWEEN DIABETICS AND OTHERS LIVING IN THE BELLA COOLA VALLEY

ABSTRACT. **Objective:** To investigate the relative effect that diabetes has on self-rated health, satisfaction with various specific domains of life, and satisfaction with quality of life operationalized as happiness, satisfaction with life as a whole, and satisfaction with overall quality of life. **Design:** Mixed methods – mailed survey and chart review. **Study Population:** All people aged 17 years or older, residing in the Bella Coola Valley in September 2001 and having a chart at the Bella Coola Medical Clinic. **Main outcome measures:** Self-rated health, self-rated stress, rating of self-care received, global life satisfaction (Life as whole; Overall standard of living; Overall quality of life; and Overall happiness); and satisfaction with various domains of life. **Results:** A total of 968 useable surveys were returned for a response rate of 56% (968/1734). Age was negatively related to General Health, but positively related to Life Satisfaction. Not being of Aboriginal descent was positively related to all of the four global health indicators and to Subjective Well-Being. After accounting for age, race, and weight, we found that diabetics report significantly poorer self-rated health, and lower satisfaction with health scores compared to people without diabetes. Participants with diabetes who were the least compliant with their treatment regimens rated their current health significantly lower than those who were the most compliant. People with diabetes were, however, no more likely to be unhappy or dissatisfied with their lives as a whole or with the overall quality of their lives compared to people without diabetes. Among people with diabetes, however, those who used insulin did report significantly less satisfaction with the overall quality of their lives than those who didn't use insulin. **Conclusion**: Diabetics understand they have poorer health than others, but they do not have poorer global life satisfaction scores. This may explain why it is difficult to get diabetics to adopt behaviours which may lower their quality of life – e.g., diet plans, lose weight, engage in exercise programs, or take medications.

KEY WORDS: diabetes mellitus, quality of life, rural health, satisfaction

INTRODUCTION

Diabetes has been described as a "burgeoning worldwide epidemic." The most recent available Canadian data indicate that in 1998/1999, the physician-diagnosed prevalence of diabetes in people who were 20 years of age and older was approximately 1.05 million (Canadian Diabetes Association, 2003). This number translates to 4.8% of the total Canadian population. Yet, previous estimates suggest that the true proportion may actually be greater than 7%. In any case, these statistics are alarming: Not only are they associated with huge financial costs to the Canadian healthcare system, but they are also an indication of the tremendous potential that exists for deterioration in Canadians' quality of life. Having diabetes substantially increases one's risk of developing blindness, end stage renal disease, lower limb amputations, and dying from coronary artery disease, stroke, or peripheral vascular disease (Murphy, 2000; Wilson et al., 1991).

Quality of life studies among people with type 2 diabetes highlight several common findings. First, increasing age among people with type 2 diabetes appears to be associated with worse self-reported physical and social functioning, as measured by the SF-36 (Camacho et al., 2002; Jacobson et al., 1994; Johnson et al., 1996). However, other studies of people in the general population (Fugl-Meyer et al., 2002) and people with mental illnesses (Mercier et al., 1998) have found that increasing age is significantly associated with greater satisfaction with several aspects of life. Insulin use among people with type 2 diabetes is associated with worse self-reported physical and social functioning, and with more limitations in role functioning due to physical health problems (Camacho et al., 2002; Johnson et al., 1996).

People with type 2 diabetes who use insulin appear to have worse self-perceived health (Johnson et al., 1996) and they report being less satisfied with and more negatively impacted by their current diabetes treatment regimens (Jacobson et al., 1994) compared to those not using insulin.

Number of diabetes-related complications has also been associated with reports of less satisfaction with current diabetes treatment regimen, worse role functioning due to physical health problems (Jacobson et al., 1994), and worse emotional well-being, as well as with greater role limitations due to emotional health problems (Johnson, 1996) among people with type 2 diabetes.

Our review of the literature on the broad topic of quality of life among people with type 2 diabetes did not reveal any study that operationalized quality of life as happiness, or even as satisfaction with life as a whole or with overall quality of life. As well, no studies appear to have investigated the relative impact that diabetes has on either self-rated health or quality of life, *separate* from other potential influences. For instance, if a woman is aging, Aboriginal, and overweight or obese – all risk factors for developing diabetes – what additional impact might developing diabetes have on her self-rated health and quality of life that wasn't perhaps already being felt?

The present study investigates the individual impacts that diabetes, gender, race – broadly categorized as *Aboriginal* or *all others* – age, and Body mass index (BMI), have on the self-rated health, healthcare services, stress, satisfaction with various domains of life, and quality of life of residents of a rural British Columbia community. Each of these analyses is intended to contribute to the overall goal of determining the relative impact that diabetes has. Among the sub-population of people with type 2 diabetes, the influences of insulin use, extent of compliance with diabetes treatment regimen, and extent of diabetes-associated morbidity on the above items will also be investigated. Following the example of Michalos et al. (2000), quality of life will be operationalized as happiness, satisfaction with life as a whole, and satisfaction with overall quality of life (Michalos et al., 2000).

METHODS

A Health and Quality of Life Questionnaire was offered to all adults (age 17 and up) living in the Bella Coola Valley of British Columbia between August 2001 and May 2002. Details of this survey are reported elsewhere (Michalos et al., In press). Twenty-one questions of this questionnaire form the basis of this research paper. The first question is a self-rating general health question which is also the first question in SF-36 (Ware et al., 1993). The next is a self-rating question on the respondent's current life stress level (Hudson, 1982). Next, the respondent is asked to rate the personal health care he or she receives in the Bella Coola Valley. Then the respondent is asked

to rate 16 quality of life items, including happiness, satisfaction with life as a whole, health, spiritual fulfilment, overall quality of life, overall standard of living, as well as residence, neighbourhood, family relations, living partner, job, friendships, financial security, recreational activities, self-esteem, and personal safety around home. Lastly, there were two demographic questions on gender (male or female) and age (years). These quality of life questions have been part of numerous surveys distributed throughout the north and world; so comparisons can be readily made (Michalos, 1986, 1991, 2003; Michalos and Zumbo, 2000; Michalos et al., 2000; Michalos and Zumbo, 2001; Michalos, 2002).

Table I summarizes the survey items, their abbreviations, Likert score ranges, and the specification of Likert score ranges. An identification number was given to each questionnaire sent out. Dr Thommasen was the only one able to link this number to the 2001 clinic patient list. This information was used for the purposes of

TABLE I

Overview of survey questions and number of pair respondents

	Abbrev	Likert #	Specification of likert #
Survey item			
Self-rated health	SF1	1–5	Excellent to poor
Self-rated stress	ST12	1–7	Unstressful to stressful
Self-rated health care services	HC1	1–5	Poor to good
Satisfaction with:			
House, apartment, home	QL1	1–7	Dissatisfied to satisfied
Neighborhood	QL2	1–7	Dissatisfied to satisfied
Family relations	QL3	1–7	Dissatisfied to satisfied
Living partner	QL4	1–7	Dissatisfied to satisfied
Job	QL5	1–7	Dissatisfied to satisfied
Life as Whole	QL6	1–7	Dissatisfied to satisfied
Friendships	QL7	1–7	Dissatisfied to satisfied
Health	QL8	1–7	Dissatisfied to satisfied
Religion, spiritual fulfillment	QL9	1–7	Dissatisfied to satisfied
Overall standard living	QL10	1–7	Dissatisfied to satisfied
Financial security	QL11	1–7	Dissatisfied to satisfied
Recreational activities	QL12	1–7	Dissatisfied to satisfied
Self-esteem	QL13	1–7	Dissatisfied to satisfied
Personal safety around home	QL14	1–7	Dissatisfied to satisfied
Overall quality of life	QL15	1–7	Dissatisfied to satisfied
Happiness	QL16	1–7	Unhappy to happy

re-mailing, and for linking survey responses to clinic charts. All recipients were asked to read an informed consent form or were read an informed consent form prior to completion of a questionnaire. Questionnaire answers were entered into an electronic EXCEL spreadsheet from which results were summarized and graphs of the data were later made (Harvey, 1994).

At the same time the Health and Quality of Life questionnaire was being offered to residents of the Bella Coola Valley, Dr H. Thommasen did three retrospective reviews of clinic charts. The first chart review was done in July–August 2001 to determine who was still living in the Bella Coola Valley. After excluding clinic charts of people not living within the Bella Coola Valley and not currently living in the Bella Coola Valley, 2329 patients made up the September 2001 Clinic population list – approximately 104% of the May 2001 census estimate (British Columbia Vital Statistics Agency, 2003a, b). After defining the Bella Coola Medical Clinic population, clinic charts were once again reviewed in the spring of 2004 for the following information: age, sex, aboriginal status, number of clinic visits, height, weight, presence or absence of diabetes and other chronic diseases. From the chart review 127 diabetics were identified. Diabetic charts were then reviewed for the following information – date of diagnosis and duration of diabetes (years); blood glucose and glycoslyated hemoglobin (HgA1c) levels over time; presence or absence of diabetes related morbidities (coronary artery disease, peripheral vascular disease, nephropathy, retinopathy, or neuropathy); diabetic management recommendations with respect to medications (oral hypoglycaemic agents and insulin); whether or not that patient received diabetic education teaching, saw an internist, saw a dietician. A morbidity scoring system was developed (see Appendix A). Finally, a compliance scoring system was also developed. Bella Coola's Nurse Practitioner, who works closely with residents who have diabetes, was asked to provide a crude rating of each person's compliance with his or her current diabetes treatment regimen. Compliance was ranked on a scale ranging from 1 (*low*) to 3 (*high*).

Chart derived information was entered into an electronic EXCEL spreadsheet from which results were summarized and graphs of the data were later made (Harvey, 1994). Lastly, identification numbers on each returned Health and Quality of Life questionnaire were

linked to the 2001 Bella Coola Clinic population list so that survey responses could be linked to chart review information. Names and addresses were removed from this linked data set, and passed on to statisticians and other researchers for further analyses.

Differences in the outcomes between diabetics and non-diabetics, as well as the differences between ethnic groups (aboriginal vs. others), between age groups, between sexes (male vs. female), and between weight groups were evaluated using Pearson's chi-square or One Way ANOVA tests with a significance p-value ≤ 0.05 for each outcome measure (Snedecor and Cochran, 1980).

RESULTS

Survey Response Rates

A total of 971 questionnaires were returned, of which 968 were useable for the purposes of this project. An estimated 1734 Bella Coola adult residents were eligible to complete our questionnaire. So the estimated response to this survey was 56% (968/1734). Of the 968 questionnaires, 964 were linked to names on the Bella Coola Clinic patient list.

Comparison of responder to non-responder populations reveals that a proportionately greater number of women, older people, people who were not aboriginal, and diabetics answered the survey questions as compared to younger people, men, aboriginal people, and people who are not diabetic, respectively.

Comparison of diabetic responders to non-responders reveals no differences between the two groups with respect to age, weight, BMI, HbA_{1c} values, years with diagnosed diabetes, morbidity scores, compliance scores, gender distribution, race distribution, proportion taking either oral hypoglycemic agents or insulin, or number of physician visits in 2001. Only one parameter differed between the two diabetic groups, namely, the mean total number of health facility visits among those who participated in the survey was greater than that of those who did not participate ($M = 21.99$, $SD = 17.53$ and $M = 14.61$, $SD = 13.24$, respectively), $t\,(125) = 2.15$, $p\,<\,0.05$.

Table II presents mean self-rated health, health care services, stress, and quality of life scores for people without diabetes and those with diabetes. We were interested in comparing the scores of partic-

ipants who didn't have diabetes with those who had diabetes that was associated with either low, medium, or high levels of morbidity. However, the latter two categories were combined due to small numbers. Participants without diabetes tended to rate their health significantly better than participants with diabetes that was associated with either level of morbidity, $F(2924) = 29.74$, $p < 0.001$. Participants with diabetes that was associated with medium-to-high morbidity appear to have thought, on average, that the stress in their lives was fairy evenly balanced ($M = 4.54$, $SD = 1.93$), participants without diabetes and with diabetes that was associated with low morbidity appear to have thought that their lives were at least a little stressful ($M = 3.50$, $SD = 1.55$ and $M = 3.42$, $SD = 1.30$, respectively). These differences were significant, $F(2940) = 6.24$, $p < 0.001$. Meanwhile, participants both without diabetes and with diabetes that was associated with either low or medium-to-high morbidity appear to have thought, on average, that the health care services they received were better than average ($M = 3.44$, $SD = 1.11$; $M = 3.53$, $SD = 1.22$; and $M = 3.72$, $SD = 1.25$, respectively), and there was no evidence that any of their mean scores for this item were significantly different, $F(2951) = 1.10$, $p > 0.05$. No mean quality of life score for participants in any category fell below 4.0 (*evenly balanced*). However, compared to participants without diabetes, those who had diabetes that was associated with low morbidity were, on average, significantly less satisfied with their health ($M = 4.93$, $SD = 1.60$ and $M = 4.32$, $SD = 1.57$, respectively), $F(2931) = 5.86$, $p < 0.008$.

Insulin use. Regardless of whether they used insulin, participants with diabetes appeared to think, on average, that their current health was less than good ($M = 2.00$, $SD = 0.82$ and $M = 2.54$, $SD = 0.84$ for participants who did and did not use insulin, respectively). Despite this similarity, participants who used insulin rated their current health significantly lower than those who did not use insulin, $t(92) = 2.18$, $p < 0.05$. Meanwhile, both groups appeared to think, on average, that the health care services they received were somewhere between average and good ($M = 3.77$, $SD = 1.17$ and $M = 3.56$, $SD = 1.24$ for participants who did and did not use insulin, respectively), and that their lives were at least a little stressful ($M = 3.33$, $SD = 1.44$ and $M = 3.83$, $SD = 1.61$ for participants who did and

TABLE II

Self-rated health, health care services, stress, and quality of life

Survey item	Without diabetes			With diabetes					
				Morbidity category					
				Low (1.0–2.0)			Medium to high (2.5–4.0)		
	M	SD	n	M	SD	n	M	SD	n
Current health***	3.29	1.02	833	2.58	0.82	67	2.19	0.88	27
Health care services	3.44	1.11	859	3.53	1.22	66	3.72	1.25	29
Life stress*	3.50	1.55	851	3.42	1.30	64	4.54	1.93	28
Domain-specific quality of life indicators									
Satisfaction with									
House, apartment***	5.37	1.68	854	5.09	1.98	66	6.56	0.93	27
Neighborhood	5.70	1.52	852	5.53	1.50	66	6.32	1.16	28
Family relations	5.72	1.47	848	5.54	1.55	65	6.32	1.12	28
Living partner	5.87	1.60	719	5.96	1.76	45	6.11	1.23	18
Job	4.98	1.69	684	5.30	1.82	40	5.58	1.73	12
Friendships	5.61	1.43	847	5.89	1.40	65	5.73	1.66	26
Health**	4.93	1.60	843	4.32	1.57	63	4.36	1.78	28
Religion, spirituality	5.14	1.62	782	5.41	1.70	61	5.83	1.23	23
Financial security	4.36	1.84	839	4.06	2.02	65	5.00	1.98	25

Recreation activities	4.51	1.71	831	4.14	1.86	63	4.96	1.98	23
Self-esteem	5.15	1.54	836	5.02	1.64	66	5.62	1.58	26
Personal safety	5.74	1.40	842	5.67	1.26	64	6.17	1.27	24
Global quality of life indicators									
Satisfaction with									
Life as a whole	5.41	1.47	846	5.53	1.57	66	5.69	1.49	26
Overall standard of living	5.36	1.47	846	5.24	1.58	66	5.54	1.63	26
Overall quality of Life	5.48	1.39	851	5.32	1.55	66	5.41	1.58	27
Overall happiness	5.49	1.58	863	5.43	1.46	67	5.54	1.42	28

Notes: Current health and health care services were rated on 5-point scales ($1 = poor$, $3 = good$, $5 = excellent$, and $1 = poor$, $3 = average$, $5 = excellent$, respectively). All other indicators were rated on 7-point scales ($1 = very\ stressful/dissatisfied/unhappy$, $4 = evenly\ balanced$, $7 = very\ unstressful/satisfied/happy$).

*$p < 0.05$. **$p \leq 0.008$. ***$p \leq 0.001$.

did not use insulin, respectively). Of all the mean quality of life scores, the only one that fell below 4.0 (*evenly balanced*) was satisfaction with health for participants who took insulin.

Compliance with diabetes treatment regimen. Regardless of the extent to which they complied with their recommended diabetes treatment regimens, participants with diabetes appear to have thought, on average, that their current health was somewhat less than good ($M = 2.29$, $SD = 0.86$; $M = 2.41$, $SD = 0.78$; $M = 2.87$, $SD = 0.82$ for participants in the low, medium, and high compliance categories, respectively); that the healthcare services they received were somewhere between average and good ($M = 3.52$, $SD = 1.13$; $M = 3.59$, $SD = 1.32$; $M = 3.71$, $SD = 1.30$ for participants in the low, medium, and high compliance categories, respectively), and that their lives were at least a little stressful ($M = 3.67$, $SD = 1.44$; $M = 3.90$, $SD = 1.80$; $M = 3.75$, $SD = 1.62$ for participants in the low, medium, and high compliance categories, respectively). Nevertheless, of all the survey items, the only one for which there was evidence of an effect by extent of compliance as categorized for the present study was current health, $F (291) = 3.80$, $p < 0.05$. Differences between means tests (Bonferroni) revealed that the worst mean rating of current health for participants in the lowest compliance category compared to that for participants in the highest compliance category was the only significant contributor to this finding. Satisfaction with health had the lowest mean score for participants in the low compliance category ($M = 4.07$, $SD = 1.54$), while satisfaction with financial security had the lowest mean score for participants in both the medium ($M = 4.11$, $SD = 1.70$) and the high ($M = 4.48$, $SD = 2.33$) compliance categories. As these data indicate, there was no instance for which satisfaction with any quality of life item fell below 4.0 (evenly balanced).

Self-rated health. The way participants rated their current health was significantly influenced in univariate analyses by whether they had diabetes, as well as what their races, ages, and BMIs were. Stepwise regression analysis revealed that, when these variables were considered concurrently, each one was retained as a significant predictor of how participants rated their current health, $F (4884) = 34.42$, $p < 0.001$. Together, they accounted for approxi-

mately 14% of the variation in current health ratings. Presence of diabetes was most influential, accounting for 6% of this variation, followed by race, age, and BMI (βs $= -0.14$, -0.22, -0.19, and -0.098, respectively). In a practical sense, this means that having diabetes, being Aboriginal, being over 45 years old, and having a BMI equal to or greater than 25.0 each predicted lower self-rated health, but even when these characteristics were considered concurrently, approximately 86% of the influence came from other things.

Satisfaction with health. It has also been noted that participant satisfaction with their health was significantly influenced in univariate analyses by whether they had diabetes and what their ages were. However, stepwise regression analysis revealed that only the presence of diabetes ($\beta = -0.073$) was retained as a significant predictor when these two factors were considered concurrently, $F(1916) = 4.96$, $p < 0.05$. That is, participants who had diabetes associated with low morbidity tended to be less satisfied with their health than others. However, this accounted for only a mere 0.5% of the variation in how satisfied participants were with their health: 99.5% was left up to other things.

Satisfaction with overall quality of life. Since satisfaction with overall quality of life among the total sample of survey participants was significantly influenced in univariate analyses by both their ages and their races – that is, whether they were Aboriginal or part of the group of all others – stepwise regression analysis was used to determine the relative importance of the latter in predicting the former. Interestingly, only race ($\beta = -0.10$) was retained as a significant predictor, $F(1937) = 8.69$, $p < 0.008$. That is, being Aboriginal was associated with significantly less self-reported satisfaction with overall quality of life. However, this explained only 0.9% of the variation in participants' satisfaction, which means that approximately 99.1% was explained by factors other than their races, ages, genders, BMIs, or even whether they had diabetes.

DISCUSSION

Recent studies have shown that keeping blood sugar levels within normal range reduces chances of developing at least some of the

complications associated with having diabetes (American Diabetes Association, 2001; Diabetes Control and Complications Trial Research Group, 1993; Thompson, 1997; Tildesley, 1997; UKPDS, 1998, 2000). Consequently, an important aspect of Type 2 diabetes treatment is lowering blood sugar levels through diet, exercise, and medications (Brown, 1976; Hu and Stampfer, 2001; Pan, 1997; Schneider, 1992; Vaaler, 2000). Comprehensive management of diabetic patients also includes monitoring glycosylated hemoglobin, blood pressure, and lipids, encouraging smoking cessation, and the prophylactic use of acetylsalicylic acid (ASA) (American Diabetes Association, 2001; Expert Committee of the Canadian Advisory Board, 1998). Whenever possible, diabetic patients should receive dietary advice from a registered dietician. If adequate blood sugar levels have not been reached on a regimen that includes appropriate use of diet, exercise and oral agents, then insulin therapy should be initiated to improve diabetic control. The rationale is that if insulin is started early enough, endogenous insulin secretion might transiently or partly recover, reducing overall insulin requirements (Berger, 1999; Ilkova, 1997; Lindstorm, 1999).

Unfortunately, in the real world it is extremely difficult to get diabetic patients to adhere to diet plans, to lose weight, to engage in exercise programs, to take hypoglycaemic, antihypertensive, cholesterol lowering agents, or to accept insulin. Perhaps by understanding how diabetic patients view their health and quality of life, one can get insights into why it is so difficult to engage diabetics in long-term treatment plans. For example, if a diabetic patient is very satisfied with his or her overall quality of life, or is very happy in life, he or she may not feel motivated to change things, adopt behaviours, or take medications which may impact happiness or overall quality of life. Denial may be an issue. If a diabetic feels that he or she is not really unhealthy, that may be a reason for why he or she does not wish to change behaviour. If our aim is to encourage people with diabetes to adopt and maintain recommended diabetes self-care behaviours, there is a need to further understand how they view their disease and its impact on their lives.

As Gafvels et al. (1993) noted, "self-perceived health has been suggested to play an important role in the adherence to diabetic management and metabolic control (Gafvels et al., 1993)." We have shown in the present study that regardless of the extent of their

associated morbidity, people with diabetes recognize, on average, that their current health is less than good. In fact, as has been found in other studies, people with diabetes rated their health significantly less favorably, on average, than people without diabetes (Stewart et al., 1989). However, Aboriginals, people over 65 years old, and obese people – that is, people who had BMIs that were 30.0 or greater – also appeared to think, on average, that their current health was less than good. These results are consistent with those of other studies that have found a deterioration in self-reported physical functioning associated with being Aboriginal (British Columbia Provincial Health Officer, 2002), as well as with increasing age (Jacobson et al., 1994; Johnson et al., 1996) and BMI (Lean et al., 1999).

When presence of diabetes, race, age, and BMI were considered concurrently, each one remained a significant predictor of how participants rated their current health. Together, these factors accounted for approximately 14% of the variation in participants' current health ratings. Nevertheless, presence of diabetes was most influential, accounting for 6% of this variation, followed by race, age, and BMI.

Considering this, it seemed worthwhile to focus on the impact that having diabetes had on participants' *satisfaction* with their health. Certainly, it seems plausible that, even though a person may recognize that his or her current health is not good, he or she may not feel motivated to maintain or improve it if they are already satisfied with it. In the present study, participants' satisfaction with their health was significantly influenced by whether they had diabetes and by what their ages were. However, when these two factors were considered concurrently, having diabetes was retained as a significant predictor of their satisfaction with their health. Specifically, participants who had diabetes that was associated with a low level of morbidity tended to be less satisfied with their health than others, both without diabetes or with diabetes that was associated with a medium to high level of morbidity. Jacobson et al. report "worries about the future of diabetes are possibly stimulated by the start of a pharmacological treatment but recede once the anticipated injections begin (Jacobson et al., 1994)." Perhaps a similar phenomenon accounts for the lower scores among those with lower morbidity as these would typically be recently diagnosed diabetics.

One might expect that poor self-rated health and diminished satisfaction with health might lead to improved self-care. However, in

the present study, participants with diabetes who were the least compliant with their treatment regimens actually rated their current health significantly lower than those who were the most compliant.

Interestingly, people with diabetes, regardless of the extent of their associated morbidities, were no more likely to be unhappy or dissatisfied with their lives as a whole or with the overall quality of their lives compared to people without diabetes. In fact, only race and age had any influence. Compared to all others, Aboriginal people rated their satisfaction with the overall quality of their lives significantly lower and, compared to 46- to 64-year-olds, 65- to 94-year-olds were significantly more satisfied with the overall quality of their lives and their lives as a whole. As well, compared to 17- to 45-year-olds, 65- to 94-year-olds were significantly more satisfied with their lives as a whole. These findings are consistent with those of other studies of people in the general population (Fugl-Meyer et al., 2002) and people with mental illnesses (Mercier et al., 1998) that have found that increasing age is significantly associated with greater satisfaction with several aspects of life.

Among people with diabetes, however, those who used insulin do report significantly less satisfaction with the overall quality of their lives than those who don't use insulin. Certainly, this finding is not surprising, and is consistent with those of other studies. For instance, Jacobson et al. (1994) reported that, among their sample of 240 people who had either type 1 or type 2 diabetes, those who used insulin were significantly less satisfied with, and reported a significantly greater negative impact from, their diabetes treatment regimens. As well, they found that people who were being treated with diet alone had better general health perceptions (Jacobson et al., 1994).

So, if our aim is to encourage people with diabetes to adopt and maintain recommended diabetes self-care behaviours, doing so will likely not result in improvements in current health or quality of life self-ratings – especially if insulin is being used to control blood sugar. Based on the findings in our study, quality of life self-ratings may actually decrease once insulin is initiated. This may explain why diabetic patients are very reluctant to begin insulin despite current recommendations that they be started on it. As Watkins et al. (2000) found, it may actually be individuals' levels of understanding of the common aspects of a diabetes treatment regimen

and their perceptions of how much control they have over diabetes – for instance, feeling that they are able to keep their blood sugar in good control, keep their weight under control, do the things they need to do for diabetes, and handle their feelings about their diabetes – that are the most significant predictors of their acceptance of recommended treatment regimens (Watkins et al., 2000).

CONCLUSION(S)

After accounting for age, race, and weight, we found that diabetics report significantly poorer self-rated health, and lower satisfaction with health scores compared to people without diabetes. Participants with diabetes who were the least compliant with their treatment regimens actually rated their current health significantly lower than those who were the most compliant. People with diabetes were, however, no more likely to be unhappy or dissatisfied with their lives as a whole or with the overall quality of their lives compared to people without diabetes. Among people with diabetes, those who used insulin reported significantly less satisfaction with the overall quality of their lives than those who didn't use insulin.

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APPENDIX A

Morbidity scoring system

Eye Disease
1. None   *none known*
2. Minimal   *background retinopathy*
3. Moderate   *proliferative retinopathy / laser Rx*
4. Severe   *blindness*

Cerebrovascular Disease
1. None   *none known*
2. Minimal   *carotid bruit*
3. Moderate   *hx of TIA's; thromboenderectomy*
4. Severe   *CVA's*

Neuropathy
1. None   *none known*
2. Minimal   *decreased touch/temp*
3. Moderate   *neuropathic pain*
4. Severe   *decreased touch/temp and pain*

Coronary artery disease
1. None   *none known*
2. Minimal   *angina (stable); ischemic ECG/Positive stress changes*
3. Moderate   *CABG; prior MI - now stable; angioplasty*
4. Severe   Post-MI; post-CABG, but still unstable eg CHF or persisting angina

Peripheral vascular disease
1. None   *none known*
2. Minimal   *decreased/absent pedal pulses; and/or femoral bruit*
3. Moderate   *claudication pains*
4. Severe   *bypass or amputation toes/foot/leg; ischemia of bowel*

Nephropathy
1. None   *none known*
2. Minimal   *proteinuria*
3. Moderate   *peritoneal/hemodialysis*
4. Severe   *transplant*

Note: Each person's *overall* morbidity score was calculated based on his or her individual morbidity ratings: (1.0) none were greater than 1.0; (2.0) one was 2.0, and all others were less than 2.0; (2.5) more than one was 2.0, and all others were less than 2.0; (3.0) one was 3.0, and all others were less than 3.0; (3.5) more than one was greater than three, and all others were less than three; (4.0) one was 4.0, and all other were less than 4.0; (4.5) more than one was 4.0, and all others were less than 4.0. For example, someone with proteinuria and no other known diabetes-related disease would have an overall morbidity score of 2.0.

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