Well-Being and Treatment Satisfaction in Older People With Diabetes

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OBJECTIVE — To measure well-being and treatment satisfaction and their correlates in older people with diabetes.

RESEARCH DESIGN AND METHODS — A postal survey was conducted of 1,000 diabetic patients aged ≥60 years, representing 56% of the resident older diabetic population in an inner-city health district with a largely indigenous population of 230,000 people and a widely varied socioeconomic mix. Well-being and treatment satisfaction were measured with diabetes-specific instruments and correlated with patient data held in a central register.

RESULTS — There was an 81% response. The general well-being scores (median [interquartile range]) for patients on diet alone, tablets, and insulin were 54 (44–60), 53 (42–61), and 48 (35–56) ($P < 0.001$ comparing insulin with diet and tablets) compared with a scale maximum of 66. Treatment satisfaction scores were 35 (31–36), 35 (32–36), and 34 (30–36) ($P < 0.001$ comparing insulin with diet and tablets), scale maximum 36. Mean HbA_{1c} concentrations were 5.0 ± 1.4% (for patients on diet alone), 5.8 ± 1.6% (tablets), and 6.6 ± 1.7% (insulin) ($P < 0.001$ for each difference). Neither well-being nor treatment satisfaction correlated with HbA_{1c}. Insulin-treated patients were younger and had been diabetic longer than non–insulin-treated patients; their well-being remained slightly, but significantly, lower when adjusted for age, sex, BMI, and diabetes duration, but treatment satisfaction was no longer significantly different. Women had lower well-being than men.

CONCLUSIONS — It has proved possible to measure well-being and treatment satisfaction in a large community-based samples of older people with diabetes. At the level of glycemic control in this population, neither parameter correlated with HbA_{1c}. The lower well-being in insulin-treated patients remained significant in multivariate analysis.

The 1990 St. Vincent Declaration (1) has been accepted throughout Europe as a manifesto for a better outlook on diabetes. The targets that have attracted the most attention are reductions in blindness, amputations, renal failure, and cardiovascular disease. Prominent though these complications are in the minds of patients and caregivers, diabetes is intrusive and may affect well-being even in patients without complications. Another clause of the St. Vincent Declaration calls for a "life experience approaching that of the nondiabetic." This is self-evidently important, but "life experience" is hard to define, let alone to measure. Perhaps that is why surveys tend to concentrate on glycemic control and the hard outcome measures of tissue complications and mortality.

Unlike children and pregnant women, older people with diabetes were not singled out in the St. Vincent Declaration as a group with special needs. There are a number of reasons why this could be challenged. The U.K. prevalence of diabetes in people aged >60 years is ~10%, and up to half are undiagnosed (2,3). Older people constitute half the diabetic population but are less likely to attend a hospital (4) and are more likely than younger people to be missed by surveys in the specialist "centers of excellence" recommended in the St. Vincent Declaration (1). They are very prone to macrovascular disease, may be socially isolated, and may receive many drugs (5). They will increase in number with growth of the older population.

We set out to measure well-being (6) and treatment satisfaction (7) in a large population-based sample of older diabetic people, to identify factors that correlate with these measures, and to provide normative data for improving the quality of care.

RESEARCH DESIGN AND METHODS

The study was approved by the Local Research Ethics Committee and conducted in accordance with the Declaration of Helsinki. Salford is a geographically compact inner-city area of Greater Manchester that has a population of 230,000 people and a socioeconomic mix ranging from affluence to severe deprivation. Less than 2% of the general Salford population and no more than 10% of the diabetic population is black or from ethnic minority groups, and most people from ethnic minorities are aged <60 years (Salford Community Health Council, unpublished observations). Primary care is provided by 160 general practitioners working in 30 single-handed and 45 group practices supported by well-developed community services. Secondary medical care is provided by a multidisciplinary team working in the Diabetes Centre of a teaching hospital. HbA_{1c} is measured in a central biochemistry laboratory by a commercial enzyme immunoassay (primary calibration; DAKO, Ely, Cambridgeshire, U.K.). When constructing a reference range, HbA_{1c} concentrations in nondiabetic subjects were found not to conform to a Gaussian distribution (manufacturer's data); a rank-based nonparametric method was used to establish a range of up to 4.9%. Because the distribution is non-Gaussian, diabetic data are not quoted as standard deviations above control mean.

Salford Collaborative Diabetes Care Program

This was established in 1988 as a joint initiative between the hospital Diabetes Centre and general practitioners. A district protocol

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was developed that defined therapeutic policies and thresholds for hospital referral, backed up by in-service training for general practitioners, practice nurses, and optometrists. A District Diabetes Liaison Committee, composed of primary care and hospital-based professionals along with Health Authority and patient representatives, assumed overall management responsibility for diabetes care in the district. A central feature of the program is a computer register, first established in 1992 and holding annually updated details of all diabetic patients in the district, identified at hospital and/or in general practice attendances (8). Biochemical data, including HbA_{1c} concentrations, are entered by record linkage with the district pathology computer. The register is continually updated and acts as a call/recall system and a source of audit data. The overall prevalence of diabetes is consistently recorded at 2%, suggesting that most cases are identified.

Older people have access to the same services as younger people, but there has been no specific initiative to target them in the diabetes care program. Whether in primary or secondary care, all older diabetic subjects have an annual review comprising a clinical interview, measurement of blood pressure and visual acuity, direct fundoscopy through dilated pupils, foot inspection, sensory testing, and measurement of HbA_{1c} and serum creatinine. Patients are seen at other times by a physician, nurse, dietitian, podiatrist, or optometrist in response to any new problem or to manage problems found at annual review. Many are reviewed every three months in primary care. Almost all care is provided under government insurance. What little private care there is comes from the same providers and under the same management policies as care under the National Health Service.

Well-being and treatment satisfaction scales

We chose two instruments specific to diabetes (6,7). The Well-Being Questionnaire consists of 22 items scored on a 0–3 Likert scale, from which are calculated subscale scores for depression, anxiety, energy, and positive well-being. A higher value on the scale indicates more of the mood described by the scale description. A general well-being score is calculated by reversing the scores of negative items, summing the four subscale scores, and adjusting to achieve a scale maximum of 66 (general well-being = 36 – depression – anxiety + positive well-being + energy). The Diabetes Treatment Satisfaction Questionnaire has eight items, each rated on a seven-point Likert scale; six (items 1 and 4–8) are summed to produce a measure of treatment satisfaction with scores ranging from 0 (very dissatisfied) to 36 (very satisfied). The remaining two items are treated individually. Item 2 measures perceived frequency of hyperglycemia on a scale ranging from 0 (none of the time) to 6 (most of the time), and item 3 measures perceived frequency of hypoglycemia on the same scale.

Subjects and method of study

At the time of the study, there were 1,819 patients aged ≥60 years on the register. The 26 older Salford participants in the U.K. Prospective Diabetes Study (9) were excluded from study because their care is special to the trial protocol and involves a treatment randomization. Of the remaining 1,793 patients, 1,000 (56%) were selected from the computer using random numbers. Because there are local variations in levels of deprivation within the district, the distribution of post codes in the sample was checked and found to be consistent with the age-specific distribution in the 1992 census. The questionnaires were mailed to patients with a cover letter requesting their cooperation, explaining the study, asking if they had ever been on insulin, and asking them to confirm their present type of treatment and source of care. Nonresponders were sent a second questionnaire 1 month later. If there was no response, a check was made with the general practitioner as to whether the patient had died or moved away.

Glycemic control

Because of incomplete record linkage, HbA_{1c} results within the preceding 12 months were unobtainable through the district register for some patients. No additional action was taken for patients not selected for the survey. Results were obtained by a manual search of computer records for patients who were selected but did not respond (increasing the availability of a result within 12 months to 52%). Selected patients who responded to the questionnaire and for whom no result could be found were asked to have blood taken within 2 weeks, increasing availability of a result to 86%.

Data analysis

The patient's age, sex, BMI, and diabetes duration were obtained from the register. Of responders, 13% omitted a single answer from the Well-Being Questionnaire and 5% from the Treatment Satisfaction Questionnaire; to calculate the aggregate general well-being and treatment satisfaction scores and avoid losing the patient from the data analysis, the missing answer was estimated from their other answers using discriminant analysis. Furthermore, 17% and 8%, respectively, omitted multiple answers and could not be included in the analysis of aggregate scores. Group comparisons were performed using Student's t tests, Mann-Whitney U tests for non-normally distributed data, and χ^2 tests. Bivariate correlation was performed by Pearson's correlation. Multiple regression analysis was used to test interrelationships between questionnaire results and other data. $P < 0.01$ was taken as significant for the correlation analysis to allow for the number of comparisons. Results are shown as means ± SD or median (quartiles).

RESULTS

Response rate and demographic details

Of the 1,000 patients, 63 had died, 25 had incorrect addresses, 6 had moved from the area, and 2 were incorrectly registered as diabetic. Of the remaining 904 patients, 648 (72%) replied to the first mailing and 86 (10%) to the second, 162 (18%) did not reply, and 8 (1%) refused, giving a response rate of 81%. Of responders, 17% were on diet alone, 55% were on tablets, and 28% were on insulin. Mean age was 71 ± 7 years for the responders, 72 ± 7 years for the patients who did not reply (nonresponders), and 72 ± 7 years for the 793 patients who were not selected. Median duration of diabetes was 8 (4–14) years in all groups. Women constituted 49% of responders, 50% of nonresponders, and 49% of nonselected patients. Demographic details of the responders according to treatment type are shown in Table 1. Patients on insulin were slightly younger than those on tablets or diet alone. Median diabetes duration and the proportion under hospital care increased from diet to tablets and from tablets to insulin. Of the patients, 63% were under shared care (regular general practice attendance and hospital visits usually just once a year), and the remainder were under general practitioner–only care.

HbA_{1c} and BMI

Mean HbA_{1c} was 5.9 ± 1.7% for the responders, 6.0 ± 1.8% for the nonresponders, and 6.2 ± 2.0% for the nonselected

Table 1—*Demographic details of patients who responded*

	All	Diet	Tablets	Insulin	Difference: Tablets − Diet	Difference: Insulin − Tablets
n	734	126	404	204	—	—
Age (years)	71 ± 7	71 ± 7	71 ± 7	69 ± 7	0.1 (−1.3 to 1.5)	−2.1 (−3.3 to −1.0)*
Sex (% male)	51	52	53	48	−1 (−11 to 9)	4.7 (−13.1 to 3.7)
Diabetes duration (years)	8 (4–14)	4 (2–6)	8 (2–12)	14 (8–24)	3 (2 to 4)†	7 (5 to 8)*
BMI (kg/m²)	28.1 ± 5.0	27.9 ± 4.3	28.3 ± 4.7	27.9 ± 5.8	0.4 (−0.6 to 1.4)	−0.4 (−1.3 to 0.5)
Hospital attenders (%)	63	33	56	95	23 (13 to 32)†	39 (33 to 45)*

Data for diabetes duration are medians (interquartile range); data for difference are estimated difference (95% confidence limits). *$P < 0.001$ compared with patients on tablets; †$P < 0.001$ compared with patients on diet alone.

patients (no significant differences). Mean BMI was 28 ± 5 kg/m² for responders, nonresponders, and nonselected patients alike and did not differ between treatment groups (Table 1). Mean HbA_{1c}, shown in Fig. 1, was lower in the diet (5.0 ± 1.4%) than the tablet group (5.8 ± 1.6%) (mean difference 0.7, 95% confidence limits 0.4–1.1, $P < 0.001$) and lower in the tablet than the insulin group (6.6 ± 1.7%) (mean difference 0.8, 95% confidence limits 0.5–1.1, $P < 0.001$).

Well-being and treatment satisfaction

Results for the whole group of responders and individual treatment groups are shown in Table 2. There were no differences between patients on diet alone and those on tablets, but patients on insulin had slightly worse scores in each category of response. Likewise, women scored worse than men in every category except energy and treatment satisfaction (Table 3). Too few patients on diet and tablets used home blood glucose monitoring to allow any conclusions to be made about how perceptions of high and low blood sugars differed according to treatment or sex.

Correlates of well-being and treatment satisfaction

The well-being subscale values were highly interrelated, with a lowest pairwise correlation of 0.61 (R^2 = 37%, $P < 0.0001$). The diabetes treatment satisfaction score correlated with general well-being ($r = 0.47$, R^2 = 22%, $P < 0.0001$). Patients with longer diabetes duration were generally more depressed ($r = 0.11$, $P = 0.007$) and lacking in energy ($r = -0.12$, $P = 0.004$), positive well-being ($r = -0.11$, $P = 0.006$), and general well-being ($r = -0.11$, $P = 0.005$). There was no significant correlation between any measure of well-being or treatment satisfaction and HbA_{1c}, age, or BMI.

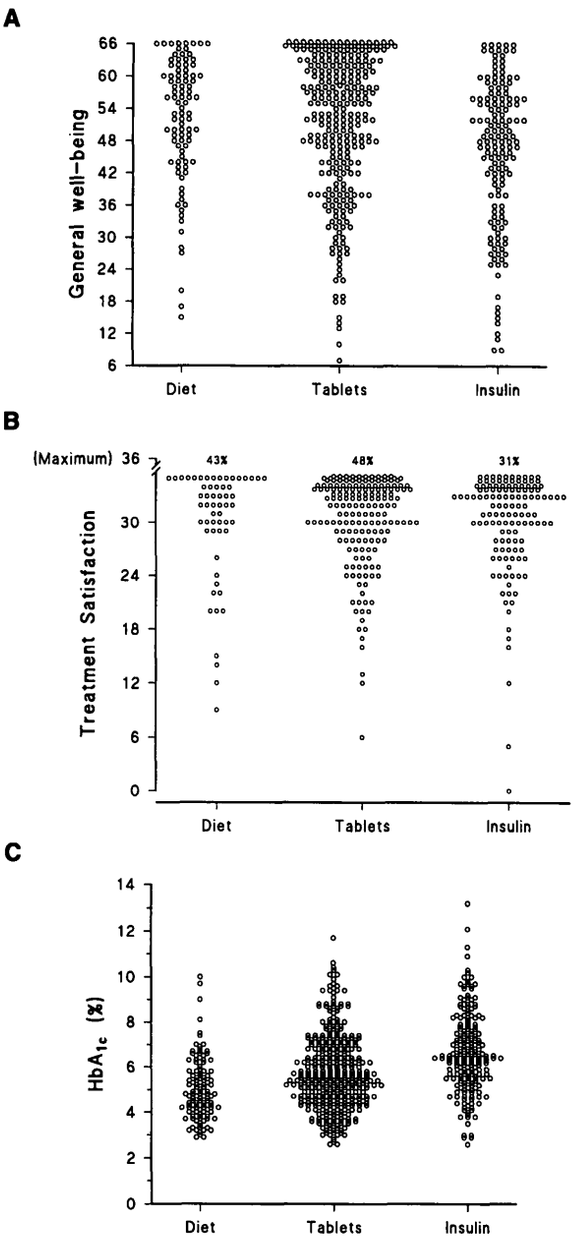

Figure 1—A: *General well-being;* B: *treatment satisfaction; and* C: *HbA_{1c} values according to treatment. Individual values are shown for all patients, grouped by treatment type. The percentages shown at the head of* B *represent patients with a maximum treatment satisfaction score of 36.*

Table 2—*Well-being and treatment satisfaction*

	Possible maximum	All subjects	Diet	Tablets	Insulin	Difference (Insulin − diet/tablets)
n	—	734	126	404	204	—
Depression	18	2 (0–5)	2 (0–4)	2 (0–5)	4 (1–7)	1 (1 to 2)*
Anxiety	18	3 (1–7)	2 (1–6)	3 (0–6)	4 (1–8)	1 (0 to 2)†
Energy	12	7 (5–10)	8 (6–10)	8 (5–10)	7 (4–9)	−1 (−2 to 1)*
Positive well-being	18	15 (11–17)	15 (12–17)	15 (12–18)	13 (9–16)	−1 (−2 to 1)*
General well-being	66	52 (41–60)	54 (44–60)	53 (42–61)	48 (35–56)	−6 (−8 to −3)*
Treatment satisfaction	36	35 (31–36)	35 (31–36)	35 (32–36)	34 (30–36)	−1 (−1 to 0)*

Data are medians (interquartile range) except data for difference, which are estimated differences (95% confidence limits) For each of the six measures, a higher value indicates more of the state described by the scale description. There were no significant differences between the diet and tablet groups ($P \geq 0.2$). *$P < 0.001$; †$P < 0.01$, comparing insulin with diet and tablet groups combined.

The difference in general well-being between insulin-treated and non–insulin-treated patients (mean −5.8, confidence limits −8.0 to −3.5, $P < 0.0001$) persisted but weakened (mean −3.7, confidence limits −6.4 to −1.0, $P = 0.007$) after adjustment for age, sex, BMI, and diabetes duration. The negative association of insulin treatment with treatment satisfaction did not persist after adjustment for these factors.

CONCLUSIONS — The number of older people in the general population will, as a result of increased life expectancy, increase substantially over the next few years (10), and over half the diabetic population will consist of older people. The disproportionate burden of ill health that they carry compared with their nondiabetic peers (5) will have increasing socioeconomic consequences. Such considerations have begun to focus attention on older people with diabetes as a subpopulation worthy of special consideration. The stereotype of a geriatric patient with mild diabetes requiring minimal surveillance is now to be regarded as ageist. Nevertheless, older people may have different priorities than younger people; in particular, quality of life may be more important to them than length of life (11). Many instruments are available to measure health-related quality of life, but some consist of complex questionnaires that may be difficult and time-consuming for older people with poor vision, tremor, arthritis, or cognitive problems to complete, and their clinical usefulness is uncertain. There have been few studies of quality of life in older people with diabetes.

Health-related quality of life can be measured with generic or disease-specific instruments. A number of investigators have used generic instruments on people with diabetes (5,12–14). For example, Glasgow et al. (14) recently found that quality of life deteriorated with increasing age, lower socioeconomic status, the presence of complications, and the use of insulin in a large heterogenous sample of diabetic patients drawn from across the U.S. Generic instruments are usually well validated and have the advantage that the impact of diabetes can be compared with other diseases, but they may be less sensitive than disease-specific instruments (13). They may fail to distinguish somatic symptoms of depression and anxiety from the symptoms of poorly controlled diabetes (6) and may be insensitive to the emotional responses and attitudes that are specific to living with diabetes and its treatment. There are a number of disease-specific instruments (6,7,13,15,16), among which is the Well-Being Questionnaire developed by Bradley and colleagues (6). Initial work has shown it to be valid, reliable, discriminatory, and sensitive to change in both patients with NIDDM and those with IDDM (6,17). The scale is responsive to change from tablet to insulin treatment and from conventional to intensive insulin treatment, but scores in the validation studies have not correlated with HbA_{1c}, suggesting that it can distinguish specific cognitive symptoms associated with diabetes from the symptoms of poor glycemic control. The same workers have developed a valid, reliable, and sensitive measure of treatment satisfaction (7,17,18). The Diabetes Treatment Satisfaction Questionnaire measures how individuals perceive their glycemic control, as well as how satisfied they are with the experience of treatment. Both scales are quick and easy to use. In conjunction with measures of glycemic control and tissue complications, they provide a potentially useful outcome measure for the routine audit of diabetes care (19). However, their applicability to older people has not previously been assessed; neither have the scales been used in patients treated with diet alone, although they are considered suitable for that purpose (6,7).

Our response rate of 72%, rising to 81% after a single reminder, indicates that most older people were willing and able to rate their experience of health and treatment. Calculation of aggregate scores was complicated by incomplete responses on up to

Table 3—*Well-being and treatment satisfaction scale scores in men and women*

	Men	Women	Difference (men − women)
n	376	358	—
Depression	2 (0–4)	3 (1–6)	−1 (−1 to 0)*
Anxiety	2 (1–6)	4 (1–8)	−1 (−1 to 0)†
Energy	8 (5–10)	7 (5–9)	0 (0 to 1)
Positive well-being	15 (12–18)	14 (11–17)	1 (0 to 1)†
General well-being	54 (44–61)	49 (39–58)	4 (2 to 6)*
Treatment satisfaction	35 (32–36)	35 (30–36)	0 (0 to 0)

Data are medians (interquartile range) except for difference, which are estimated differences (95% confidence limits). For each of the six measures, a higher value indicates more of the state described by the scale description. *$P < 0.0005$; †$P < 0.005$.

one-third of questionnaires. To avoid losing the patient completely from the data analysis, single missing answers could be calculated from the patient's other responses. In future surveys, it will be important to instruct patients clearly to answer all questions or to supervise them while they complete the questionnaire. There remained 19% of our whole sample that did not respond, and ~20% of the responders that omitted multiple answers on one questionnaire or the other. They may have had poorer well-being and treatment satisfaction than those who responded, but there is no obvious reason that their failure to respond should have confounded the analysis by treatment type.

Since this is the first use of the Bradley well-being and treatment satisfaction scales in older people with diabetes, no directly comparable data are available. Moreover, the studies validating the well-being scale in tablet-treated and insulin-treated patients quoted mean rather than median values (6), and one question in the treatment satisfaction questionnaire was modified by Bradley after the validation studies to provide a single instrument for both insulin-treated and non–insulin-treated diabetes (7). With those provisos, our results in older people appear remarkably similar to Bradley's in younger people. Our results are also comparable with the studies of Bradley (17) and others (14) in that they show lower well-being in women than men. The median general well-being score of 52 (scale maximum 66) and treatment satisfaction score of 35 (scale maximum 36) provide a normative community-based foundation for future studies. This study confirms our previous finding in a case-control study (5) that many older people with diabetes are not obese and have good glycemic control and good perceived health.

Well-being and treatment satisfaction were lower in insulin-treated than non–insulin treated patients, although the difference in treatment satisfaction did not remain significant in multivariate analysis. The difference in general well-being was 6% of the scale maximum after adjustment for confounding factors, relatively small when compared with the wide scatter of results in the population and of uncertain clinical significance. It was similar to the difference between men and women (6% of the scale maximum), and cannot definitely be ascribed to insulin per se because insulin-treated patients were younger and had been diabetic longer. In previous studies we (5) and others (13,14) have found that patients with complications had worse perceived health. Insulin-treated patients in the present study may well have had more complications, confounding the apparent relationship between insulin treatment and well-being. Jacobsen et al. (20), like us, found lower quality of life and satisfaction in insulin-treated patients than in non–insulin-treated patients. In contrast, Bradley (7) found that treatment satisfaction improved when patients were switched from maximum-dose oral hypoglycemic therapy to insulin with a concomitant improvement in glycemic control and no change in well-being for better or worse (6). Insulin treatment may have had an adverse effect on well-being in some of our patients, but if it did, the effect appears small.

Mean HbA_{1c} increased stepwise in our study from diet alone to tablets and from tablets to insulin. That is unsurprising in that treatment is intensified if HbA_{1c} is poor and neither oral hypoglycemics nor insulin are fully effective at normalizing hyperglycemia (21). The policy in our center is to intensify treatment in patients with poor control, irrespective of age. In common with our own previous investigation (5), we found no correlation between HbA_{1c} and quality of life. A positive association has been reported in some cross-sectional surveys (13,15), but two recent prospective studies found no association in IDDM (22) or NIDDM (23). That serves as a reminder that glycemic control, important as it is in the prevention of complications, is not the only outcome of diabetes care. Quality of life and glycemic control are independent outcomes, and there is the possibility of achieving one at the expense of the other. Patients must be helped to take a central place in balancing those biomedical and psychosocial outcomes to their best advantage.

We have been able to measure glycemic control, well-being, and treatment satisfaction at the population level as a measure of the effectiveness of our care and as a baseline for our own program of continuous improvement in health care quality. We offer these data as a baseline for comparison with other populations and suggest that the instruments are suitable for intervention studies to compare treatment effects more definitively in older people.

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