ments included many different components (exercise, group support, therapist attention), it is impossible to determine which components were responsible for the improvements in mood. Further research with larger sample sizes is needed to determine the factors responsible for the improvement in mood state.

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Clinic Attendance and Glycemic Control
Study of Contrasting Groups of Patients With IDDM

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Objective: To assess factors associated with attendance at a specialized clinic for diabetes care. Research Design and Methods: Adults with insulin-dependent diabetes mellitus (IDDM) in poor (HbA$_1$ ≥12%) versus good (HbA$_1$ ≤10%) control and with no known complications comprised the study group. Results: Infrequent attenders were in worse glycemic control than regular attenders ($\chi^2 = 6.60$, $P \le 0.01$) and held health beliefs that downplayed the importance of getting advice from physicians ($P \le 0.002$) or providing opinions to physicians about what might be done to improve their health ($P \le 0.001$). Conclusions: Because infrequent attenders are more likely to be in poor glycemic control and thus at greater risk for diabetic complications, engaging them in regularly supervised treatment has important personal and public health implications. Additional studies are needed to understand why some diabetic patients limit their contact with medical providers and to develop more effective strategies for reversing this process. Initial findings from this study suggest that patient beliefs about the doctor-patient relationship may influence clinic attendance. Diabetes Care 14:599–601, 1991

Compliance with medical recommendations is an important factor in determining glycemic control. The assessment of compliance among diabetic patients is a formidable task with no clear golden ruler (1,2). One form of compliance, the pa-

tient's willingness to participate in care by coming to medical appointments, is readily measured and provides an index of the opportunity to intervene. This aspect of diabetes compliance has not been the subject of psychosocial research, and little is known about the characteristics of patients with diabetes who do participate in regular medical follow-up versus those who do not. Thus, we examined the relationship of compliance with medical recommendations for frequency of clinic attendance to level of glycemic control and selected demographic and psychological factors in a sample of adult patients with insulin-dependent diabetes mellitus (IDDM).

RESEARCH DESIGN AND METHODS

This study was performed as part of an ongoing project that assessed psychosocial characteristics of IDDM patients who had contrasting levels of long-term glycemic control (3). Patients with known complications of diabetes were excluded (3).

Patients were screened for their frequency of appointments and glycemic control. Those with at least three previous diabetes-related medical appointments during the 2-yr period before the scheduled appointment (regular attendance group) were compared with patients having fewer than three prior visits (infrequent attendance group). This cutoff was used because it meant that

regular attenders were coming for appointments at least once every 6 mo, the minimum recommended frequency of medical appointments for adult patients with IDDM followed at the center. All patients were stratified according to level of glycemia. Poor control was defined as a mean HbA_1 of $\geq 12\%$, and good control was defined as a mean HbA_1 of $<10\%$. Patients with a mean HbA_1 between these cutoffs were excluded from study. Initially, all HbA_1 measurements taken over the previous 2 yr were identified, and patients meeting the HbA_1 criteria were used to characterize the patients. Because of the paucity of HbA_1 data for infrequent attenders, the period was extended to 5 yr. All patients had had at least one HbA_1 measurement in the previous 5 yr.

A total of 126 patients were eligible for the study. Of these patients, 97 (77%) agreed to participate in the study.

Glycemic control was assessed by measurement of total HbA_1 with the agar gel electrophoresis method (4).

Beliefs about diabetes were measured by an abbreviated form of a questionnaire developed by Derby et al. (5). Two items that addressed patient beliefs about doctor-patient interactions were specifically examined, because we expected they would differentiate regular and infrequent attenders. Responses to each of the statements were made on a five-point scale ranging from strongly disagree to strongly agree.

The anxiety, depression, and phobic anxiety scales of the SCL-90 were used to assess dimensions of psychiatric symptomatology (5). This measure has been widely used and subjected to repeated assessments of its validity and reliability (6). Symptomatology was assessed because we thought that high levels of distress might be more common in patients who attended the clinic infrequently.

The Hypoglycemic Fear Survey (7) addresses behaviors relating to the patient's self-treatment and worry about hypoglycemia. Each subscale contains items that are rated by subjects from 1 (never) to 5 (very often). Total scores for each subscale are derived from the sum of the individual items. Hypoglycemia fears were studied because we anticipated that fears of insulin treatment could lead to avoidance of clinic visits.

χ^2-Analyses were used to examine proportions. Two-way analyses of variance (attendance group $\times$ control level) were used to examine relationships when attendance was dichotomized into infrequent and regular groups. Analyses were also performed with attendance as a continuous variable (multiple regression and nonparametric t tests). $P < 0.05$ (2-tailed) was statistically significant.

RESULTS

No significant differences were found between attendance groups in terms of social/demographic factors such as social class (8), duration of diabetes, distance that the

TABLE 1
Sample demographic characteristics

	Regular attenders		Infrequent attenders	
	n	%	n	%
Men	38	59	14	42
Women	26	41	19	58
Social class				
1–2	33	51	15	46
3	20	31	12	36
4–5	11	18	6	18
Marital status				
Married	34	53	15	46
Separated/divorced	2	3	0	0
Never married	28	44	18	54
Insurance status				
Private	52	81	24	72
HMO/PPO	9	14	6	18
Medicaid	0	0	1	3
No insurance	3	5	2	7
Distance living from clinic				
<40 miles	45	70	23	70
40–100 miles	18	28	5	15
>100 miles	1	2	5	15
Age (yr)	29.8 ± 5.6		28.7 ± 4.7	
Duration of insulin-dependent diabetes (yr)	9.8 ± 2.7		10.3 ± 2.4	

Values are means $\pm$ SD. HMO, health maintenance organization; PPO, preferred provider organization.

patient lives from the clinic, or insurance coverage (Table 1). Infrequent and regular attendees had a similar low number of visits to physicians outside of the clinic, i.e., only 7% of the infrequent attenders and 7% of the regular attenders reported more than one medical visit outside the clinic in the previous 2 yr. Infrequent attenders were asked if financial problems limited use of the clinic; only 3 of 33 infrequent attenders responded affirmatively.

We found that 23 of 33 infrequent attenders vs. 27 of 64 regular attenders were in poor glycemic control ($\chi^2 = 6.60$, $P \leq 0.01$). Because we had obtained the clinic attendance and glycemic control data from the charts of all prospective subjects, we performed a second analysis, which included the 29 patients who could not be reached or refused to participate in the interview portion of the study. The results of this analysis of all eligible patients did not differ from the analysis of study participants. We also examined the relationship between glycemic control and attendance with attendance as a continuous variable. This showed that patients in poor glycemic control had fewer clinic visits than patients in good control (Mann-Whitney U test 2.24, $P < 0.05$).

Two-way analysis of variance (attendance group $\times$ glycemic control level) revealed that infrequent clinic attenders demonstrated health-care beliefs that downplayed involvement with their physicians. Compared

with regular attenders, they were less desirous for advice about the care of their diabetes ($F = 11.41$, $P \leq 0.002$) or of providing their physicians with opinions about their own medical care ($F = 12.41$, $P \leq 0.001$). No other attendance group or glycemic control level differences emerged from these analyses. We then performed a multiple regression analysis in which HbA_1, health beliefs, anxiety, depression, and hypoglycemic fears were regressed on attendance. For this analysis, attendance was treated as a continuous variable. Both health beliefs entered into the model significantly: desire to be given advice (partial $F = 13.5$, $P \leq 0.0004$) and desire to tell physician opinions (partial $F = 6.1$, $P \leq 0.02$). No other variables entered into the model, which accounted for 20% of the variance in attendance.

CONCLUSIONS

This study indicates that patients who follow up at infrequent intervals are more likely to exhibit poor glycemic control than regular attenders who follow clinic guidelines for visit frequency. The association of attendance rate with glycemic level suggests that use of clinical services may be a valuable index of important aspects of patient compliance. This study does not demonstrate a causal direction in this relationship. It highlights the unaddressed medical problems of infrequent clinic attenders. For example, a growing literature suggests that level of glycemic control influences rates of diabetic complications (9). Our findings imply that infrequent attenders are at high risk for these complications. Indeed, some research suggests that infrequent attendance at specialized clinics for diabetes care increases the risk of later diabetic complications (10,11).

We found that infrequent attendance was not associated with demographic factors that we expected would inhibit the use of medical facilities, e.g., low social class, distance from the clinic, or lack of health insurance. Infrequent attenders were also not distinguishable from regular attenders in their level of reported psychiatric symptoms or fears of hypoglycemia.

Our health beliefs inquiry suggested some possible differences between infrequent and regular clinic attenders in their attitudes toward patient-physician interactions. Compared to regular attenders, infrequent attenders were less desirous of being asked by their physicians to give opinions about their health care or told by their physicians methods for better controlling their diabetes. This suggests that infrequent attenders feel relatively disconnected from the patient-provider interchanges about medical treatment. Note that the infrequent attenders in this study were not compensating for low visit frequencies at the specialized center by higher visit rates to outside providers. The available technological improvements in the care of diabetes will not influence the medical status of these patients who are disengaged from any medical follow-up. This project suggests that further research on the reasons for infrequent clinic attendance and the techniques for engaging low utilizers of medical care could make an important impact on the health outcomes of diabetic patients. Our study indicates that specific attention should be paid to patient perceptions of the nature of their relationships with medical providers. Interventions that address the provider-patient interaction may be useful for improving clinic attendance.

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