Physicians' and Patients' Views of Problems of Compliance with Diabetes Regimens

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Synopsis

Thirty noninsulin-dependent diabetic patients and 30 residents in internal medicine at Cleveland Metropolitan General Hospital were surveyed regarding their perceptions of the difficulties of complying with diabetic regimens. Three main components of compliance were investigated (medication, diet, and urine testing), and each component was broken down into three separate tasks.

Physicians and patients rated the components on a scale of 0 to 10. For each of the three components, physicians rated compliance tasks as more difficult than did the patients. In addition, statistically significant differences were found in the difficulty ratings given separate tasks within each component of compliance. Finally, a statistically significant interaction reflected differences in difficulty ratings of patients compared with those of physicians for the various tasks associated with dietary compliance.

Results indicated that physicians and diabetic patients differ in their perceptions of compliance difficulties. It would appear that either physicians were overestimating the difficulty that diabetic patients experience with various tasks or that patients underestimated (or underreported) their difficulty. Possible sources of these differences and their implications for patient and physician education are discussed.

IT IS WELL KNOWN THAT a substantial proportion of diabetic patients fail to comply with some or all aspects of the standard regimen for treatment of diabetes. Noncompliance is a major problem for health professionals concerned with the treatment of most serious chronic illnesses. Estimates of noncompliance range from 33 to 82 percent of patients, depending on the population and the regimen being examined (*1-9*). Although the literature on patient education is replete with both theoretical and empirical examinations of compliance, the qualities that define the noncompliant patient remain elusive. Level of compliance appears unrelated to socioeconomic and other demographic characteristics as well as specific personality traits (*1,5,6,8-15*). Moreover, although patients' knowledge of their therapeutic plans is a necessary, but not sufficient, component of compliance (*6*), knowledge of the disease process itself is unrelated to compliance (*1*). Similarly, educational programs designed to promote compliance have been generally unsuccessful (*1,11,15-17*).

Several researchers have proposed that compliance may not be a unitary phenomenon and that it is, therefore, not surprising that the search for the "compliant patient" has been unsuccessful (*4,6,10*). These researchers have observed that, depending on a variety of situational factors, a patient who complies with all aspects of some medical regimens may be only partly compliant or even totally noncompliant with other regimens. Factors that have been found to be predictive of compliance levels include the nature of the disease and of the medical regimen (*1,3-6,15,18*). Specifically, it has been observed that patients are least likely to comply with medical regimens that are complex and require a substantial degree of behavioral change over a prolonged period (*4-6*). The problem is exacerbated when the patient is asymptomatic, and the benefits of compliance are not immediately apparent (*18*). Other situational factors such as the quality of the patient-health care provider relationship and certain sociobehavioral characteristics of the patient (for exam-

ple, the existence of familial emotional and concrete support and the patient's own beliefs about the severity of the disease and efficacy of treatment) have also been associated with compliance (*15*). However, it is the characteristics of the disease and its treatment (for example, its chronicity and the complexity of treatment), and not the characteristics of the patient or the health care provider, that are the best predictors of compliance (*1*).

The implications of these findings for diabetes are clear. Diabetes is a chronic disease; the medical regimen is highly complex and requires a substantial degree of behavior change (*6,8,11*). Thus, it is an inherently difficult regimen to follow. In addition, treatment consists of a number of components that are themselves rather complex. The diabetic patient's diet, for example, requires not only that the patient consume a specific number of calories but that meals be eaten at specified times (*6,8,11*).

Noncompliance with treatment among diabetic patients has been associated with metabolic disorders that, in turn, may be related to a variety of serious complications including retinopathy, nephropathy, neuropathy, and cardiovascular disease. This possible association between compliance and such complications is not, however, always readily apparent to the patient. For example, a patient may fail to follow dietary recommendations for many years before experiencing any of the aforementioned complications. In addition, there is clinical anecdotal evidence that avoiding the immediate effects of hypoglycemia may be more important to many patients than avoiding the possible long-term effects of high blood glucose levels (*19*).

As the research indicates, patients are rarely, if ever, totally compliant or totally noncompliant. Rather, they comply with some aspects of a regimen and not others. In order for health care professionals to promote and foster compliance successfully, it is necessary to understand patients' perceptions of compliance difficulties. Thus, one purpose of this study was to examine patients' perceptions of the difficulty of the various aspects of the diabetic treatment regimen.

Most studies concerned with identifying the variables that mediate compliant behavior focus on patient characteristics, beliefs, and attitudes. There is evidence, however, that physicians' attitudes and beliefs may also be important. For example, it has been found that educating physicians about specific problems of compliance that their patients may encounter may be more effective than educating patients (*4*). Thus, a second purpose of this study was to examine physicians' perceptions of the difficulty of various aspects of the diabetic regimen and to compare these perceptions to those of the patients.

Methods

Subjects. The physician subjects were 30 residents in the Case Western Reserve University-Cleveland Metropolitan General Hospital Department of Medicine who responded to a questionnaire distributed to all 50 medical residents. All of these residents were assigned one day a week to the medical clinic, an assignment which involved, among other responsibilities, primary care for a number of diabetic outpatients.

Patient subjects were 30 noninsulin-dependent diabetics who were being followed in the medical clinic of Cleveland Metropolitan General Hospital by the residents in the sample. Although these subjects ranged in age from 31 to 86 years, it was a predominantly older group, with only one person younger than 40 ($\bar{X}$ = 61.75 years, SD = 9.74). Patients' self-report of the number of years since onset of diabetes ranged from 7 to 45 years ($\bar{X}$ = 13.12, SD = 10.48). The vast majority (76.7 percent) reported that the number of years since onset of the disease was 20 or fewer.

Procedure. For physicians, questionnaires, along with an explanatory cover letter, were left in their clinic mailboxes and were collected at the end of each day. Approximately 2 weeks after the questionnaires were distributed, a letter was sent to all medical residents thanking those who had completed the questionnaire and urging those who had not yet done so to complete and return the questionnaire promptly.

To collect data on patients, diabetic patients who were scheduled for appointments in the clinic were approached by a research assistant, who then led each patient through a questionnaire parallel to the physician's questionnaire. Because of the limited education of many patients, the research assistant read the questions to each person and recorded the responses. Before administering the questionnaire, subjects were assured that none of their caregivers would have access to their answers.

The questionnaire consisted of a rating scale which divided three major areas of compliance—medication, diet, and urine testing—into three specific tasks associated with each area. For medication, the tasks were (*a*) integrating medica-

Table 1. Means, standard deviations, and F-ratios of Group X task difficulty ratings for the three major components of diabetic compliance

Task	Patients		Physicians		F-ratios		
	Mean	SD	Mean	SD	Group	Task	Group by task
Medication:							
1. Integrating into daily routine ...	90	1.08	2.87	2.13	[1] 26.43, df = 1,57	[2]14.95, df = 2,114	.19, df = 2,114
2. Taking at proper time	1.76	2.23	3.50	2.11			
3. Taking amount prescribed	.14	.35	2.20	2.23			
Diet:							
1. Avoiding prohibited foods	6.86	3.17	7.28	1.98			
2. Not exceeding recommended amount	5.45	3.75	7.52	1.98	[1]11.96, df = 1,56	[2]15.61, df = 2,112	[1]6.13, df = 2,112
3. Adhering to schedule	3.38	2.77	6.52	2.20			
Urine testing:							
1. Carrying out task	1.85	3.22	5.53	2.33	[2]28.09, df = 1,55	[2]8.05, df = 2,110	2.14, df = 2, 110
2. Recommended frequency	2.96	3.08	6.73	2.07			
3. Recommended time	3.44	3.46	6.03	2.22			

[1]$P < .01$. [2]$P < .001$.

tion taking into their daily routine, (*b*) taking it at prescribed times, and (*c*) taking the prescribed amount. The aspects of dietary compliance surveyed were (*a*) avoiding prohibited foods, (*b*) not exceeding the recommended amount, and (*c*) adhering to the recommended schedule. For urine testing, the tasks were (*a*) carrying out urine testing, (*b*) checking urine as frequently as recommended, and (*c*) checking it at recommended times. Patients rated the difficulty they had with each task on a scale of 0 to 10; physicians rated the difficulty they thought their patients as a group had with each task on the same scale.

Results

Means and standard deviations for physicians' and patients' responses on the rating scale of specific aspects of compliance appear in table 1. A 2 (Group-patients versus physician) X 3 (Compliance Tasks) analysis of variance with repeated measures was computed for each of the three major components of the diabetic regimen (medication, diet, urine testing). Results of these analyses are also presented in table 1.

As table 1 illustrates, for each of the three analyses of variance there was a significant main effect for Group. This main effect indicates that for each component of the diabetic regimen (medication, diet, and urine testing), the physicians rated compliance tasks as more difficult than did patients. In addition, there was also a significant main effect for Task in all three analyses of variance. Thus, regardless of which group was rating the tasks, there were significant differences in the perceived level of difficulty of different tasks within each component of compliance.

Finally, a significant interaction was found between Group and Task in the analysis of variance for diet ratings. This interaction reflects differences in the difficulty ratings of patients and physicians for the tasks related to dietary compliance. As illustrated in table 1, there were minimal differences in the difficulty ratings of physicians compared with patients regarding the avoidance of prohibited foods, but there were large differences between physicians and patients in the ratings given to the task of not exceeding recommended amounts of food as well as adherence to their dietary schedule. No significant interaction effects were found for the analyses of the difficulty ratings for medication or urine testing.

Post hoc analyses were conducted to specify further the differences in difficulty ratings for specific tasks associated with medication, diet, and urine testing. Results of Newman-Keuls analyses are shown in table 2. The Newman-Keuls analysis allows pairwise comparisons to be made between cell means within a given analysis of variance. Given that the study yielded a significant main effect for Task in all three analyses of variance, the Newman-Keuls analysis permitted a determination of which means differed significantly from each other. Each number which appears in table 2 reflects the difference in mean difficulty ratings between the two compliance tasks which are listed

Table 2. Results of pairwise comparisons between mean difficulty ratings of compliance tasks

Compliance tasks	Differences	
	Patients	Physicians
Medication:		
Integrating into daily routine versus taking at proper time	[1].86	.63
Integrating into daily routine versus taking amount prescribed	[1].78	[2].67
Taking at proper time versus taking amount prescribed	[1]1.64	[1]1.30
Diet:		
Avoiding prohibited foods versus not exceeding recommended amount	[1]1.41	.24
Avoiding prohibited foods versus adhering to schedule	[1]3.48	.76
Not exceeding recommended amounts versus adhering to schedule	[1]2.07	[2]1.00
Urine testing:		
Carrying out task versus recommended frequency	[1]1.11	[1]1.20
Carrying out task versus recommended time	[1]1.59	.50
Recommended frequency versus recommended time	.48	.70

Newman-Keuls significance levels: [1] $P < .01$; [2] $P < .05$.

in the first column. Newman-Keuls analyses were done separately for the patient group and the physician group.

Discussion

Results of this study demonstrate that physicians and diabetic patients differ in their perceptions of compliance difficulties. Physicians rated compliance tasks for all three components of diabetic regimen (diet, medication, and urine testing) as more difficult than did patients, irrespective of the specific task. Thus, with medication, whether the focus is integrating medication into the patient's daily routine, taking it at the proper time, or taking the amount prescribed, physicians consistently rated the various compliance tasks as more difficult than did the patients. The same phenomenon held true for the other two components, diet and urine testing.

It would appear that either physicians were overestimating the difficulty that diabetic patients experience with the various tasks or that patients were underestimating (or underreporting) their difficulty. If the physicians were overestimating, it is possible that this is a function of their general frustration with those noncompliant diabetic patients they serve. If, on the other hand, it is the patients' responses which were distorted, two possibilities exist. One is that patients may have been reluctant to admit the extent of their compliance problems to the interviewer, even though they had been assured that the treatment staff would not have access to their responses. The other possibility is that patients indeed deny even to themselves the degree of difficulty that compliance with the diabetic regimen presents for them, as one manifestation of a general denial of their illness and its severity. It is impossible to determine from these data which interpretation might be correct, but it should be noted that patients' responses, which tended to fall below the midpoint ("moderately difficult") might seem suspiciously low, given clinicians' reports of the prevalence of noncompliance among diabetic patients.

Irrespective of the causes of the differences between patients' and physicians' perceptions of the difficulty of complying with the various components of the diabetic regimen, the overriding significance of these differences lies in the fact that it is important for patients and physicians to agree on the patient's experience of trying to comply with the diabetic regimen. The current data suggest that physicians need to make every effort to discuss with their patients the difficulty that the patients are having with the various aspects of the diabetic regimen in order to arrive at a mutual understanding of how the patient is coping.

It should be noted that there was a 60 percent return rate on physicians' questionnaires, which could have resulted in a response bias. However, it is not clear in what direction this possible bias would have influenced results. It should be kept in mind that the current results are subject to the limitations of any survey in which return rates may introduce possible response bias.

Since it has been observed that compliance is not a unitary phenomenon, it might be expected that the different tasks which comprise the diabetic regimen would present differing degrees of difficulty for patients. The current data indeed support this hypothesis in that, regardless of whether

physicians or patients were rating the tasks, the level of difficulty of each task was perceived as distinct. In the case of medication, then, both patients and physicians rated taking it at the proper time as the most difficult compliance task, integrating medication into the daily routine as the second most difficult task, and taking the amount prescribed as the least difficult task. The differentiation that apparently occurs with regard to the perceived difficulty of various tasks within the diabetic regimen points to the need to address these tasks separately when attempting to foster compliance.

Highlighting this need still further are results of the Newman-Keuls analyses which indicate that patients differentiated among the various compliance tasks in terms of their difficulty to a much greater degree than did physicians. For both medication and diet, patients perceived significant differences in the difficulty associated with each of the three compliance tasks. For urine testing, the only two tasks that patients did not differentiate in terms of difficulty were testing urine with the recommended frequency and testing it at the recommended time.

In contrast, physicians' ratings of difficulty reflected perceived differences in only four of the nine comparisons. Thus, when patients think about the various tasks they must perform to maintain good diabetic control, they attach significantly different degrees of difficulty to the tasks. However, physicians, in thinking about the same tasks which they ask their diabetic patients to carry out, make fewer discriminations in terms of difficulty levels.

This difference in perceptions is understandable in that the patients must carry out these compliance tasks daily. The differing perceptions nonetheless point to the need for physicians to develop a clearer understanding of patients' perceptions of the relative difficulty presented by different aspects of their diabetic regimen and to emphasize those tasks which patients consider the most difficult.

The need for such understanding is clearly demonstrated by the results of Newman-Keuls analyses of differences in mean ratings for diet (table 2). Patients' ratings reflected a mean difference of 3.48 between avoiding prohibited foods and adhering to a schedule for meals ($P < .01$). In contrast, physicians' ratings of the same tasks indicated a difference of only .76, less that 1 point on the rating scale, a difference which was not statistically significant. Thus, when physicians or other health care professionals attempt to help patients with the complexities of dietary compliance, they may be well advised to approach this task with the knowledge that patients are likely to need much more help in avoiding prohibited foods than in adhering to a dietary schedule.

In conclusion, then, compliance with the diabetic regimen is a series of multifaceted tasks that are viewed as having different degrees of difficulty, depending upon whether one is patient or physician and upon the particular facet of compliance. Our study demonstrates some specific differences in perceived difficulty, information that should be valuable to physicians in determining which compliance tasks might require special assistance. Future research might usefully be aimed at further elucidation of the reasons diabetic patients fail in various compliance tasks and what might be done to minimize specific difficulties.

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Use of Hospital-Based Ambulatory Care in New York City's Health Manpower Shortage Areas

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Synopsis

The development of a comprehensive data base for hospital-based ambulatory care has made possible the accurate determination of each community's use of hospitals in New York City and permits a reliable estimation of all ambulatory care received by residents of Health Manpower Shortage Areas (HMSAs). In spite of the city's abundant supply of private practitioners and widespread Medicaid coverage, residents of HMSAs in New York City are heavily dependent on hospital-based ambulatory care. Contrary to commonly held notions, however, HMSA residents do not appear to overuse hospital-based ambulatory care. Rather, that use appears to be quite modest, given their poorer health status.

THE FEDERAL GOVERNMENT'S purpose in designating Health Manpower Shortage Areas (HMSAs) was to identify those areas where, for a variety of reasons, the services of primary care physicians were not easily accessible. Designated shortage areas were the beneficiaries of special programs to improve access to care, such as the National Health Service Corps. Because these programs are being cut or eliminated from the Federal budget, it seems appropriate to take a closer look at the health services utilization patterns of residents of HMSAs.

Areas are designated as HMSAs on the basis of a number of indicators: a low physician-to-population ratio, inadequate access to primary care, unusually high community needs for health care, and relatively large proportions of the community below the poverty level. One specific indicator used for the designation of HMSAs is excessive use of emergency room facilities for primary care. It can also be argued more generally that a community's dependence on hospital-based ambulatory services reflects a dearth of accessible primary care from private physicians.

Measuring a community's dependence on hospital clinics and emergency rooms has been difficult because community residents may seek care at many different hospitals within the local area and elsewhere. Estimates of dependence on hospitals for care, therefore, often have been based on the heavy patient volume and crowded conditions in local hospitals, without reference to actual patterns of use among all community residents. Recently, however, the development of a comprehensive data base on hospital-based ambulatory care in New York City by the United Hospital Fund's Patient Origin Information System (POIS) makes possible accurate determination of each community's use of all hospitals in New York City and consequently permits more reliable estimation of all the hospital care received by HMSA residents. Such estimates can be used to answer a critical question: To what