The Impact of Patient-Centered Care on Outcomes

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■ BACKGROUND We designed this observational cohort study to assess the association between patient-centered communication in primary care visits and subsequent health and medical care utilization.

■ METHODS We selected 39 family physicians at random, and 315 of their patients participated. Office visits were audiotaped and scored for patient-centered communication. In addition, patients were asked for their perceptions of the patient-centeredness of the visit. The outcomes were: (1) patients' health, assessed by a visual analogue scale on symptom discomfort and concern; (2) self-report of health, using the Medical Outcomes Study Short Form-36; and (3) medical care utilization variables of diagnostic tests, referrals, and visits to the family physician, assessed by chart review. The 2 measures of patient-centeredness were correlated with the outcomes of visits, adjusting for the clustering of patients by physician and controlling for confounding variables.

■ RESULTS Patient-centered communication was correlated with the patients' perceptions of finding common ground. In addition, positive perceptions (both the total score and the subscore on finding common ground) were associated with better recovery from their discomfort and concern, better emotional health 2 months later, and fewer diagnostic tests and referrals.

■ CONCLUSIONS Patient-centered communication influences patients' health through perceptions that their visit was patient centered, and especially through perceptions that common ground was achieved with the physician. Patient-centered practice improved health status and increased the efficiency of care by reducing diagnostic tests and referrals.

■ KEY WORDS Physician-patient relations; family practice; patient-centered care. *(J Fam Pract 2000; 49:796-804)*

see COMMENTARY *about this article by Ronald M. Epstein, MD,* **"The Science of Patient-Centered Care"** ON PAGE 805

Being patient centered is a core value of medicine for many physicians. The principles of patient-centered medicine date back to the ancient Greek school of Cos, which was interested in the particulars of each patient.[1] More recently similar concepts have arisen in a variety of fields of human endeavor: the concept of physical diagnosis and deeper diagnosis of Balint,[2] the client-centered therapy of Rogers,[3] the total-person approach to patient problems in nursing of Neuman and Young,[4] the biopsychosocial model of Engel,[5] and the disease- versus patient-centered medical practice of Byrne and Long.[6] In the past decade the patient-centered concepts of Gerteis and colleagues[7] have been applied to the hospital setting.

In the setting of primary care, and specifically family practice, patient-centered concepts incorporate 6 interactive components. The first component is the physician's exploration of both the patients' disease and 4 dimensions of the illness experience including: their feelings about being ill, their ideas about what is wrong with them, the impact of the problem on their daily functioning, and their expectations of what should be done. The second component is the physician's understanding of the whole person. The third component is the patient and physician finding common ground regarding management. In the fourth component the physician incorporates prevention and health promotion into the visit. The fifth component is the enhancement of the patient-physician relationship. Finally, the sixth component requires that patient-centered practice be realistic. Our study

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addresses the first 3 of these components. Being patient centered does not mean that physicians abdicate control to the patient[8] but rather that they find common ground in understanding the patients and more fully respond to their unique needs.[9]

What are the benefits of being patient centered? Previous research of specific communication variables indicates that patient-centered encounters result in: (1) the duration of the office visit remaining the same[10,11] (2) better patient satisfaction,[12] (3) higher physician satisfaction,[10] and (4) fewer malpractice complaints.[13] We focus on 2 other outcomes: patients' health and efficiency of care.

METHODS

Our study was designed to test the hypothesis that adult patients whose first visit in an episode of illness is patient centered will, by 2 months after the first visit: (1) more frequently demonstrate recovery from the symptom (and recovery from the concern about the symptom); (2) demonstrate better self-reported health; and (3) experience less subsequent medical care (ie, fewer visits, diagnostic tests, and referrals), compared with patients whose visit is not patient centered.

Data Collection and Participants

For our observational cohort study data were collected at 5 points: (1) the research assistant identified eligible patients in the physician's office before the visit; (2) the office encounter was audiotaped and scored for patient-centered communication; (3) the research assistant held a postencounter interview with the patient; (4) we assessed, by chart review, the use of medical care during the 2-month follow-up; and (5) we conducted a follow up telephone interview with patients 2-months after the encounter.

Physician Selection. Physicians were recruited from the 250 family physicians practicing in London, Ontario, Canada, and the surrounding area. They were randomized within strata to ensure a representative sample in terms of year of graduation and geographic location and were selected using a modified version of the method of Borgiel and colleagues.[14]

Patients. We approached patients who were older than 18 years and had 1 or more recurring problems who presented to their physician's office. Patients were excluded if they were too ill or disabled to answer questions, had no presenting problem, were in the office for counseling, were accompanied by another person, were not fluent in English, were hard of hearing, or were cognitively impaired. They were approached before they saw the physician and were blind to the study hypotheses.

Sample Size Estimation. The sample size required for correlations of 0.20 to be detected with an α set at 0.05 (2 tailed) and a β set at 0.10 was 259[15] patients. Further inflation by 10% to account for the effect of clustering on multiple regression[16] was thought to be reasonable (259÷0.9=288). Expecting 75% to cooperate, we aimed to approach 384 patients (288÷0.75).

Measures*

Measure of Patient-Centered Communication Score. The patient-centered communication score is based on 3 of the 6 components of the model of patient-centered medicine.[17-20] The first component (exploring the disease and the illness experience) received a high score when the physician explored the patients' symptoms, prompts, feelings, ideas, function, and expectations. The second component (understanding the whole person) received a high score when the physician elicited and explored issues relating to life cycle, personality, or life context, including family. The third component (finding common ground) received a high score when the physician clearly described the problem and the management plan, answered questions about them, and discussed and agreed on them with the patient. Scoring sheets and procedures are described in detail elsewhere.[21] Scores could range from 0 (not at all patient centered) to 100 (very patient centered).

Interrater reliability has been established in earlier versions of the measure and for the current version (r=0.69, 0.84, and 0.80 among 3 raters,[22] 0.91 among 2 raters,[23] and 0.83 for n=19 for our study). Intrarater reliability was 0.73 (n=20).

Correlations with global scores encompassing the 3 components supported the validity of the score (0.63 in an earlier study[23] and 0.85 for our study, n=46).

Patient Perception of Patient-Centeredness. Based on the patient-centered model, a series of 14 items developed and validated in previous studies[24,25] were used to assess the patients' postencounter perceptions of how patient centered the interaction with the physician had been.† Items were averaged into: total score, a subscore on exploring the disease and illness experience, and finding common ground. Low scores represented patient centeredness.

Patient Recovery from Discomfort and Concerns. The primary health outcome was the recovery measure based on the patients' self-administered report on visual analogue scales (VAS) of the severity of the symptom they identified as the main presenting problem and their concern about that problem at 2 points: the postencounter interview and the follow-up 2 months later.[26,27] VAS have been tested for reliability and validity in studies of pain and nausea (correlation of 0.75 with an intensity

*A chart of the variables in the multivariable analyses is available on the *Journal*'s Web site at www.jfampract.com.

†The 14 items were assigned *a priori*, if they were relevant, to the 3 components of the model of patient-centered medicine, as shown on the *Journal*'s Web site (www.jfampract.com).

score).[26] Each of the symptom recovery variables was continuous.

Patient Health Status. The Medical Outcomes Study Short Form-36 (SF-36) was used to assess self-reported secondary health outcomes. This valid and reliable measure[18] is a multidimensional assessment of: physical health, mental health, perception of health, social health, pain, and role function. All were continuous variables except role function, for which the distribution of scores necessitated dichotomizing.

Medical Care. The care provided during the 2 months following the audiotaped encounter was assessed by chart review (adapted from Bass and coworkers[24]) by 3 medical doctors (I.R.M., J.O., J.J.) blind to the identity of the family physician and the patient, and also to the patient-centered scores. Items abstracted were: the total number of visits during the 2 months (continuous variable); the number and kind of diagnostic tests ordered during the 2 months that were relevant to the problems presented at the audiotaped visit (dichotomous); and the number and kinds of referrals made during the 2 months that were relevant to the problems presented at the audiotaped visit (dichotomous).

Analysis. The hypotheses were tested using multiple regression for continuous outcomes and multiple logistic regression for dichotomous outcomes,[29] both adjusted for the effect of the clustering of patients by physician using "procedure mixed" in SAS for continuous outcomes and using both "procedure logistic" and "procedure IML" in SAS for dichotomous outcomes.[30] The unit of analysis was the patient.

The following confounding variables were included in preliminary multivariable analyses on the basis of their univariable relationships with outcomes at the level of $P < .10$: age, sex, number of family members at home, desire to share feelings, who initiated the visit, tense personality, coping skills, concomitant health problems, social support, marital status (married vs other), concomitant life problems, number of visits to the physician in the previous 12 months, and main problem (1 of 5 groups: digestive, musculoskeletal, respiratory, skin, and other).

Because of substantial sample attrition with so many covariates, and because only 2 variables were consistently associated with the outcome measures, each subsequent multivariable analysis was conducted with each of the primary independent variables and the 2 covariates (patients' main presenting problem and marital status).

RESULTS

Descriptive Results

Of the 102 randomly selected family physicians, 83 were eligible because they were still practicing in the area and had adequate office space to accommodate the research assistant. Of these, 39 (47%) agreed to participate and completed the data collection. The participants were similar to the refusers (Table 1) in year of graduation, practice location (rural or urban; high or low socioeconomic status) and sex; however, participants were significantly more likely to be certificants of the College of Family Physicians of Canada than refusers (59% and 27%, respectively; $P = .007$).

Of 464 eligible patients, 334 (72%) agreed to participate. Nineteen (~6%) were lost to the study. The final 315 participants represented an overall participation rate of 68%; their age was representative of the eligible patients, but there was a higher proportion of men than in the total group of eligible patients.

Table 2 shows that the slim majority of final participants were women, and most were middle aged and married. Typical of the city, approximately 4 in 10 had more than a high school education. The most common presenting problems were respiratory in nature.

Table 3 shows the descriptive results for key variables.

Hypothesis Testing Results

The patient-centered communication scores (based on the audiotape analysis) were not significantly related to any of the health outcomes after adjusting for the clustering of patients within practices and after controlling for the 2 confounding variables. Similarly, patient-centered communication scores were not related to any of the 3 medical care outcomes.

TABLE 1

Demographic Characteristics of Physician Participants and Refusers

CHARACTERISTIC	PHYSICIANS PARTICIPATING (N=39)	PHYSICIANS REFUSING (N=44)
Year of graduation, mean	1975	1972
Practice location		
Urban high SES, %	55.3	45.5
Urban low SES, %	15.8	22.7
Rural, %	28.9	31.8
Men, %	71.8	70.7
Certificant of the College of Family Physicians of Canada, %*	59.0	27.3

* Chi-square=7.3, df=1, $P = .007$.
SES denotes socioeconomic status.

Patient-centered communication scores (based on the audiotape analysis) were significantly correlated in the expected direction, with patient perceptions that the patient and physician found common ground (r =-0.16; *P*=.01). High scores (indicating very patient-centered communication) were correlated with low patient perception scores (indicating patient-centeredness). The 2 other patient perception scores (total patient perception score and the subscore on patient perception that the illness experience was explored) were not significantly associated with patient-centered communication scores.

The total score of patients' perceptions that the visit was patient centered was associated with positive health outcomes after adjusting for the clustering of patients within practices and after controlling for the 2 confounding variables (Table 4). Patients' postencounter levels of discomfort were lower when they perceived the visit to have been patient centered than not.

A similar result occurred for 2 other patient health outcomes: the patients' postencounter level of concern (*P*=.02), and the mental health dimension of the SF-36 measure assessed 2 months after the study visit (*P*=.05). The subscore of patient perceptions that the patient and physician found common ground was associated with one of the health outcomes, the patients' postencounter level of concern (*P*=.04). There were no significant associations of the subscore on patients' perceptions that the illness experience had been explored with any of the patient health outcome measures.

Patients who perceived that their visit had been patient centered received fewer diagnostic tests (Table 5) and referrals (Table 6) in the subsequent 2 months. The proportion receiving diagnostic tests rose from 14.6% in the group who perceived that the visit had been patient centered (total score), to 24.3% in the group who perceived the visit was not. The proportion who were referred doubled from approximately 8% to 16%. These relationships were found even more strongly for the subscore on patient perceptions that the patient and the physician found common ground, but were not found for the subscore on patient perceptions that their illness experience had been explored. The proportion receiving diagnostic tests quadrupled from 4.1% in the group who perceived that the patient and the physician found common ground, to 25.4% in the group who perceived that common ground had not been attained. The proportion who were referred doubled from 6.1% to 14.9%. The number of visits by the patient to the family physician during the subsequent 2 months was not significantly related to the patient perceptions of patient centeredness, although there was a trend (*P*=.11) with the average number of visits in 2 months in the 4 quartiles of patient perceptions as follows: 1.0, 0.8, 1.2, and 1.3.

TABLE 2

Demographic Characteristics of the Patients

CHARACTERISTIC	NO. (%)
Sex	
Women	170 (54.0)
Men	145 (46.0)
Age, years	
18-29	74 (23.5)
30-44	115 (36.5)
45-54	41 (13.0)
55-64	40 (12.7)
≥65	45 (14.3)
Marital status	
Married	190 (60.3)
Other	125 (39.7)
Level of education	
Some high school or less	92 (29.2)
Completed high school	91 (28.9)
Some college/university or more	113 (35.8)
Other	19 (6.0)
Main presenting problems	
Digestive	31 (9.8)
Musculoskeletal	71 (22.5)
Respiratory	85 (27.0)
Skin	46 (14.6)
Other	82 (26.0)

DISCUSSION

Pathway to Improved Patient Outcomes

Patient-centered practice was associated with improved patients' health status and increased efficiency of care (reduced diagnostic tests and referrals). However, only 1 of the 2 measures of patient-centered practice showed this result, the measure of patients' perceptions of the patient centeredness of the visit. The measure that was based on ratings of audiotaped physician-patient interactions, while related to the patients' perception, was not directly related to health status or efficiency.

The relationship of patients' perceptions of patient centeredness with their health and efficiency of care was both statistically and clinically significant. Specifically, recovery was improved by 6 points on a 100-point scale; diagnostic tests and referrals were half as frequent if the visit was perceived to be patient centered.

The associations we found may imply a potentially important pathway (which could be tested in future trials), such as the one shown in the Figure. The pathway suggests a process through which patient-physician communication influences patients' health, by first influencing the patients' perceptions of being a full participant in the discussions during the encounter. Such a pathway has been noted by Sobel,

whose review suggested a pathway to explain the lack of a direct relationship between patient education programs and patient health where there was a relationship between patient perceptions about their health and health outcomes. Sobel called this pathway "a biology of self-confidence."[31] He and others[32] stress the critical role of patient perceptions in the healing process, which highlight that a person's subjective experience influences biology.

How do we understand the results that show the ratings of the audiotape were not directly related to the outcomes, but the patient-centered perception measure was related to outcomes? One interpretation is that observable skills are not as important as patient perceptions. Although there is some evidence that skills training can improve both physicians' behavior and patients' health,[33] our findings and those of Bensing and Sluijs[34] indicate that differences in interviewing skills may not be associated with patient responses. Physicians may learn to go through the motions of patient-centered interviewing without understanding what it means to be a truly attentive and responsive listener. The implications of the current findings for educators are that education about communication should go well beyond skills training to a deeper understanding of what it means to be a responsive partner for the patient, during both that phase of the visit in which the problem is discussed and when the discussion of treatment options occurs. Two examples of such education approaches are: small group discussions between patients and physicians to illustrate the patients' experiences and needs, and reviews of videotaped interviews with standardized patients participating in the review. Placing prime importance on the patients' perceptions recognizes the influence of these perceptions on the patients' subsequent health and epitomizes being truly patient centered.

Views that the visit was patient centered included perceptions about the discussion of the problem (exploring the illness experience) as well as discussion and agreement about treatment options (finding common ground). There is a substantial body of research supporting the importance of these discussions. The Headache Study found that patients' perceptions that a full discussion of the problem had taken place predicted resolution of headaches after 1 year.[34] In keeping with our results, which found that finding common ground was more strongly associated with outcomes than exploring the illness experience, Riccardi and Kurtz[36] stressed that the physicians'

TABLE 3

Descriptive Results for Key Variables

VARIABLES	MEAN (SD)
Independent variables	
Patient-centered communication score (range 8 to 93)	50.7 (17.90)
Patient perception of patient centeredness total score (1 to 2.9)	1.5 (0.37)
Patient perception that the illness experience has been explored (1 to 3.3)	1.2 (0.29)
Patient perception that the patient and physician found common ground (1 to 3.3)	1.7 (0.50)
Patient assessment of level of discomfort before the visit	53.2 (27.40)
Patient assessment of level of concern before the visit	45.1 (32.70)
Dependent variables	
Patient level of discomfort postencounter	45.0 (28.50)
Patient level of discomfort 2 months later	19.8 (27.50)
Patient level of concern postencounter	22.8 (25.10)
Patient level of concern 2 months later	20.0 (29.30)
Multidimensional health*	
Physical health	7.4 (1.60)
Mental health	10.7 (4.20)
Perception of health	11.3 (5.30)
Social health	1.8 (1.20)
Pain	2.8 (1.30)
Role function (65.9% good, 34.1% poor)†	
Medical resource use	
Number of visits	
Diagnostic tests (one or more 19.4%)†	1.1 (1.40)
Referrals (one or more 9.5%)†	

SD denotes standard deviation.
*Measured by the Medical Outcomes Study Short Form-36.
†Dichotomous variables, percents in parentheses.

explanation to the patients was the crucial phase of the visit. Also, a key outcome study has found that patient agreement with the physician about the nature of the treatment and the need for follow-up were strongly associated with their recovery.[37]

Efficiency of Medical Care

We found that patient-centered practice (assessed by patients' perceptions) was associated with the efficiency of care by reducing subsequent diagnostic tests and referrals by half, after controlling for key confounding variables. These results were both statistically significant and clinically significant. Also, the number of subsequent visits to the family physician was lower (although not significantly) when the patient perceived the study visit to be patient centered. Efficiency in health service delivery was also found in a randomized trial of compassionate care in the emergency department setting with homeless patients.[38] In their study of continuity of care in Norwegian general practice, Hjortdahl and Borchgrevink[39] found that diagnostic tests were 10 times more likely to be ordered for patients about whom physicians reported the least previous knowledge compared with patients in whom they had reported fullest knowledge. Also, patients had only half the chance of being referred if their physicians knew them and their history.[38]

One possible interpretation of the results of our study is that patient-centered physicians order fewer tests and refer less often. However, countering this interpretation is the fact that individual physicians in our study showed a range of patient-centered scores, as well as a range in test ordering and referral. In addition, the statistical analysis took account of the clustering of patients within a physician's practice.

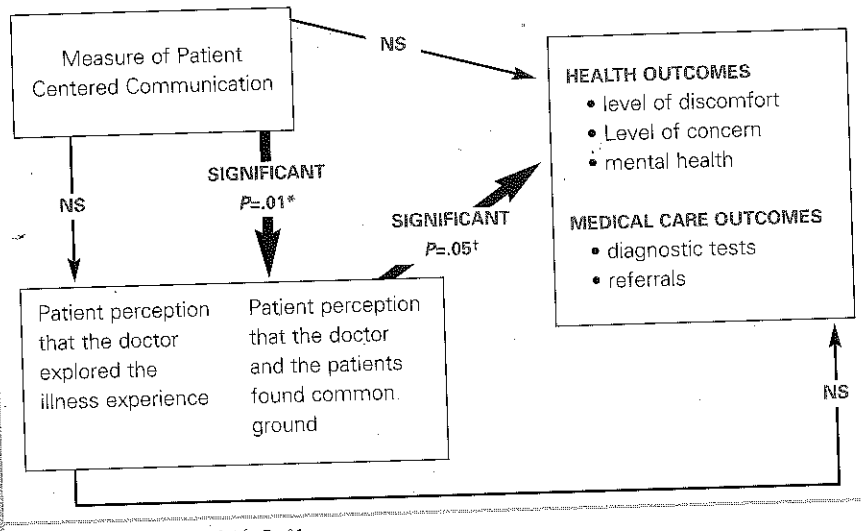
An alternative interpretation is that patients' perceptions may influence resource use in several ways. For example, increased participation during the visit may reduce patients' anxiety and their perceived need for investigations and referrals. Alternatively, patients' perception that the physician has not understood their problem may provoke insecurities resulting in a request for further medical interventions. Also, if patients openly express their discontent with the encounter there may be an increase in physicians' anxiety and a lowering of their threshold for diagnostic uncertainty, resulting in further investigations and referrals.

Certainly the finding that the failure to be patient centered (as perceived by the patient) was related to higher rates of referral and diagnostic tests should be a concern for medical education and health care policy. Perhaps of most importance is that the patients' experience of being a participating member in the discussion of the problem and the treatment process may translate into the patients' reduced need for further investigation or referral—simultaneously reducing the physicians' need as well.

These findings counter a common misconception: that being patient centered means responding to every whim of the patient, thereby increasing expenses to the health care system.

FIGURE

Diagram summarizing the relationships found among the measure of patient-centered communication, patient perceptions of patient centeredness, and outcomes.



*Pearson correlation r=0.16, P=.01.

†Multiple regressions or multiple logistic regressions adjusted for clustering and controlling for confounding variables.

Limitations

Approximately 30% of the patients refused to participate, and although the participants represented the age distribution of eligible patients, men were overrepresented in the study. Nonetheless, sex was not identified as a confounding variable for the associations studied.

Although no measure of severity was possible, the variables representing concurrent health problems and concurrent life problems were considered

TABLE 4

Multiple Regression of Patient Perception of Patient Centeredness Total Scores in Relation to Patients' Postencounter Level of Discomfort, Controlling for Baseline Discomfort (N=297)

OUTCOME: PATIENTS' LEVEL OF DISCOMFORT INDEPENDENT VARIABLES	COEFFICIENT	SE	COEFFICIENT/SE	P
Patient perception of patient centeredness, total score	6.04	2.70	2.24	.03
Baseline level of discomfort	0.84	0.04	22.50	.0001
Patients' main presenting problems				
• Digestive	6.18	4.07	1.52	.13
• Musculoskeletal	2.42	3.39	0.71	.48
• Respiratory	6.56	3.25	2.02	.04
• Other	2.42	3.24	0.75	.46
Patients' marital status	-0.63	2.03	0.31	0.76

MEAN LEVEL OF DISCOMFORT, BY QUARTILES OF THE PATIENT PERCEPTION OF PATIENT CENTEREDNESS TOTAL SCORE QUARTILE	MEAN
First quartile—perception that the visit was patient centered	42.5
Second quartile	45.0
Third quartile	45.2
Fourth quartile—perception that the visit was not patient centered	48.8

NOTE: Adjusting for the clustering of patients within practices and controlling for 2 confounding variables (main presenting problem and marital status).
SE denotes standard error.

TABLE 5

Multiple Logistic Regression of Patient Perception of Patient Centeredness Total Scores in Relation to Diagnostic Tests During the Subsequent 2 Months (n=297)

OUTCOME: DIAGNOSTIC TESTS ORDERED (YES/NO) INDEPENDENT VARIABLES	COEFFICIENT	SE	COEFFICIENT/SE	P
Patient perception of patient centeredness, total score	0.74	0.38	1.96	.05
Patients' main presenting problems				
• Digestive	1.17	0.59	1.98	.05
• Musculoskeletal	0.27	0.53	0.52	.61
• Respiratory	0.05	0.40	0.11	.91
• Other	-0.71	0.64	-1.11	.26
Patients' marital status	0.64	0.31	2.06	.04

PROPORTION OF PATIENTS RECEIVING DIAGNOSTIC TESTS, BY QUARTILES OF THE PATIENT PERCEPTION OF PATIENT CENTEREDNESS TOTAL SCORE QUARTILE	PERCENT RECEIVING TESTS
First quartile—perception that the visit was patient centered	14.6
Second quartile	17.0
Third quartile	19.5
Fourth quartile—perception that the visit was not patient centered	24.3

NOTE: Adjusting for the clustering of patients within practices and controlling for 2 confounding variables (main presenting problem and marital status).
SE denotes standard error.

TABLE 6

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TABLE 6

Multiple Logistic Regression of Patient Perception of Patient Centeredness Total Scores in Relation to Referrals During the Subsequent 2 Months (N=297)

OUTCOME: REFERRALS INDEPENDENT VARIABLES	COEFFICIENT	SE	COEFFICIENT/SE	P
Patient perception of patient centeredness, total score	0.131	0.49	2.68	.01
Patients' main presenting problems				
• Digestive	-1.11	1.16	1.52	.33
• Musculoskeletal	0.57	0.52	0.71	.27
• Respiratory	-0.77	0.67	2.02	.25
• Other	-0.39	0.67	0.75	.55
Patients' marital status	0.71	2.03	0.49	.15

PROPORTION OF PATIENTS REFERRED, BY QUARTILES OF THE PATIENT PERCEPTION OF PATIENT CENTEREDNESS TOTAL SCORE QUARTILE	PERCENT REFERRED
First quartile—perception that the visit was patient centered	7.9
Second quartile	4.3
Third quartile	6.9
Fourth quartile—perception that the visit was not patient centered	16.2

NOTE: Adjusting for the clustering of patients within practices and controlling for 2 confounding variables (main presenting problem and marital status).
SE denotes standard error.

in the analysis strategy. They were not related to the outcome variables and were therefore not entered into the multivariable analyses.

One interpretation of the lack of association between patient-centered scores on the audiotaped interviews and subsequent health outcomes may be that the audiotape measure has failed to capture the important essence of the dynamic interaction between physicians and patients. The measure had a number of strengths, however; it had been tested for reliability and validity (compared with a global rating), and it was based on a theoretical framework. Also, it was correlated with one component of the patient perception measure of a patient-centered interview, a finding which indicates that future research should be directed toward determining physicians' skills and behaviors that correlate with the patients' positive perceptions, especially the perception that common ground has been reached. Such behaviors could then be emphasized in clinical teaching.

It should be noted that the utilization data were available only from the participating practices and not from care received elsewhere. Although this is a limitation, it would be expected that this lack of data would minimize the current relationship between patient-centered practice and utilization, because patients with less favorable perceptions would be potentially more likely to seek care elsewhere. Also, drug costs and hospital costs were not included and require further study. Future research could also build on these results about resource utilization and assess the specific kinds and actual costs of the diagnostic tests and referrals.

It could be argued that the results of our study demonstrated simply that people with positive perceptions and less severe problems achieved better health and more efficient services. We counter this interpretation with 2 thoughts. First, the preliminary step in our analysis included confounding variables to control for a variety of relevant variables (ie, personality and concomitant health problems). Only 2 confounding variables were influential enough to remain in the final analysis: marital status and diagnostic code of the main presenting problem. Second, patient perceptions were not independent of the physician-patient visit. They were influenced significantly by the communication score based on the audiotaped encounter, implying that the measure of perceptions was tapping not merely the patients' general outlook on life, but also an important interactive component of visits between patients and physicians.

CONCLUSIONS

Patient-centered practice was associated with improved health status (less discomfort, less concern, and better mental health) and increased efficiency of care (fewer diagnostic tests and referrals).

Patients' perceptions of the patient centeredness of the visit, but not the measure of audiotaped interactions, were directly associated with the positive

outcomes. The subscore on patients' perception of finding common ground was more strongly associated with the positive outcomes than the subscore on patients' perception about exploring the illness experience.

Medical education should go beyond skills training to encourage physicians' responsiveness to the patients' unique experience. Therefore, involving real patients and standardized patients in teaching programs is recommended.

Health service organizations must recognize that efficiencies accrue from patient-centered practice and encourage such practice through structures that enhance continuity of the patient-physician relationship and through meaningful education programs.

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