

The Relationship Between Physician Empathy and Disease Complications: An Empirical Study of Primary Care Physicians and Their Diabetic Patients in Parma, Italy

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Abstract

Purpose

To test the hypothesis that scores of a validated measure of physician empathy are associated with clinical outcomes for patients with diabetes mellitus.

Method

This retrospective correlational study included 20,961 patients with type 1 or type 2 diabetes mellitus from a population of 284,298 adult patients in the Local Health Authority, Parma, Italy, enrolled with one of 242 primary care physicians for the entire year of 2009. Participating physicians' Jefferson Scale of Empathy scores were compared with occurrence of acute metabolic complications (hyperosmolar state,

diabetic ketoacidosis, coma) in diabetes patients hospitalized in 2009.

Results

Patients of physicians with high empathy scores, compared with patients of physicians with moderate and low empathy scores, had a significantly lower rate of acute metabolic complications (4.0, 7.1, and 6.5 per 1,000 patients, respectively, $P < .05$). Logistic regression analysis showed physicians' empathy scores were associated with acute metabolic complications: odds ratio (OR) = 0.59 (95% confidence interval [CI], 0.37–0.95, contrasting physicians with high and low empathy scores). Patients' age (≥ 69 years) also contributed

to the prediction of acute metabolic complications: OR = 1.7 (95% CI, 1.2–1.4). Physicians' gender and age, patients' gender, type of practice (solo, association), geographical location of practice (mountain, hills, plain), and length of time the patient had been enrolled with the physician were not associated with acute metabolic complications.

Conclusions

These results suggest that physician empathy is significantly associated with clinical outcome for patients with diabetes mellitus and should be considered an important component of clinical competence.

Empathic engagement in patient care is a building block of a meaningful physician–patient relationship. Despite an emphasis on empathy in medicine and its positive effects on clinical outcomes, there is a scarcity of empirical evidence to support the link between measures of physician empathy and tangible patient outcomes. However, some studies have addressed the influence of the physician–patient relationship on subjective measures of patient outcomes.^{1,2} Others report that proxy indicators of empathy in patient care, such as verbal communication and understanding nonverbal cues, as well as time spent with the patient, can increase patient satisfaction^{3,4} and compliance,^{5,6}

and lead to a lower rate of malpractice litigation.^{7,8} Also, some measures of empathic relationships have predicted psychotherapeutic effectiveness,^{9,10} patients' feelings of being important,¹¹ accuracy of diagnosis,¹² and accuracy of prognosis.¹³

Studies have shown that physicians' understanding of their patients' perspective, a key feature in the definition of physician empathy,¹⁴ enhances patients' perceptions of being helped,¹⁵ improves patients' empowerment,¹ and increases patients' perception of a social support network.¹⁴ In a factor analytic study, 52% of the variance in ratings of patient satisfaction with medical care was accounted for by the physicians' levels of interpersonal warmth and respect,¹⁶ which are among features of physician empathy.¹⁴ A study involving diabetic patients found dietitians' empathic engagement to be predictive of patient satisfaction and successful consultations.¹⁷ Another study found that empathy was the most important quality for being considered a “good physician.”¹⁸ Others reported that internal medicine residents'

self-perceived incidents of medical errors were associated with a lower level of their empathy.¹⁹

In a recent study,²⁰ physicians' accurate understanding of their diabetic patients' beliefs about their illness (as an indicator of empathic understanding) was associated with better self-care among patients (e.g., improved diet, increased blood glucose self-testing). To the best of our knowledge, however, only one recently published study reports a significant association between a validated measure of physician empathy (the Jefferson Scale of Empathy) and patient outcomes in diabetic patients (hemoglobin A1c < 7.0%, and LDL-C < 100).²¹

To confirm the generalizability of these recent findings, it would be desirable to examine whether associations between physician empathy and patient outcomes can be found in different settings. The current collaborative research agreement among Thomas Jefferson University, the Emilia-Romagna Region of Italy, and the Parma Local Health Authority provided

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the opportunity to examine the role of physician empathy in patient care in Italy. Italy has a National Health Service that provides universal coverage to all citizens free, or at minimal charge, at the point of service. The 21 regional governments have the responsibility for the delivery of health care through a network of geographically defined local health authorities. Primary care physicians are self-employed but are paid on a per capita basis under a government contract which limits the number of patients each physician may enroll and physicians' location of practice.^{22,23}

Given the importance of empathic engagement in patient care, the scarcity of empirical research linking physician empathy to objective measures of patient outcomes, and a lack of cross-cultural research on the topic, it is important to provide empirical evidence in support of the relationship between physician empathy and clinical outcomes in countries such as Italy with different medical education curricula and health care systems than the United States. Therefore, to further validate previous research findings on the relationship between physician empathy and outcomes in diabetic patients,²¹ we designed this study to examine the associations between scores of a validated measure of physician empathy with acute metabolic complications of diabetes mellitus in Italy. We hypothesized that higher empathy scores of primary care physicians would be significantly associated with a lower rate of acute metabolic complications in diabetic patients. The purpose of this study was to test this hypothesis.

Method

Setting

The study was conducted in the Parma Local Health Authority of the Emilia-Romagna region of Italy. To receive care through the National Health Service, residents in the Emilia-Romagna region must select a primary care physician. Patients are assigned a code that can be used to identify their primary care physician and to link patients to the Regione Emilia-Romagna administrative health care database. The database includes demographic data, hospital discharge abstract data, and outpatient prescription information for all

Emilia-Romagna residents, as well as information about each primary care physician in the region. At the time this research was conducted, the database included data for the period between 2002 and 2009. For research and analysis purposes, the Emilia-Romagna Region has modified the database to include an anonymous identifier to ensure patient confidentiality but allow for longitudinal analyses of patient use of the health care system. This database has been described elsewhere²⁴ and has been used extensively in health services research.²⁵⁻²⁸

Participants

In April 2010, the 301 primary care physicians in the local health authority of Parma were informed of our study through a letter sent by the general director of the local health authority. The letter explained that the purpose of the study was to examine associations between physician empathy and clinical outcomes and assured physicians that participation was voluntary and confidential. To participate, physicians would complete a paper-based, Italian-translated version of the JSE (described below). To encourage participation, we coordinated two follow-up mailings to all primary care physicians within one month after the initial mailing.

For each responding physician, we retrieved information from the Emilia-Romagna database about age, sex, practice location (plain, hill, or mountain),²⁹ and type of practice (solo versus associated in a physician practice network or in a group practice).

We used the Emilia-Romagna database to select the study population, first identifying all adult patients (18 years of age or older) who were continuously enrolled with one of the participating physicians for the entire year 2009. We then identified patients with diabetes mellitus using two criteria: (1) being hospitalized with a primary or secondary ICD-9-CM code indicating diabetes mellitus, or (2) having at least one prescription for insulin, insulin analogues, or glucose-lowering drugs at any time between 2002 (the beginning of the database) and 2009. We included patients with either type 1 or type 2 diabetes mellitus. We identified the subset of patients continuously enrolled with the same primary care physician for five or

more years as a measure of the continuity of the physician-patient relationship.

The study protocol was reviewed and approved by Thomas Jefferson University's institutional review board.

Measurement of physician empathy

As described above, we administered the JSE to the participating physicians. The JSE is a validated instrument, developed in 2001 at the Center for Research in Medical Education and Health Care, Jefferson Medical College, to measure empathy in the context of medical education and patient care.^{14,30-34} This instrument was developed based on an extensive review of the literature, and relied on the definition of empathy in the context of patient care as a predominantly cognitive attribute that involves an understanding of experiences, concerns, and perspectives of the patient, combined with a capacity to communicate this understanding with an intention to help.¹⁴

Evidence in support of the JSE's construct validity,^{14,30} criterion-related validity,³¹⁻³³ predictive validity,³⁴ internal consistency reliability,^{29,33} and test-retest reliability has been reported in medical students and physicians. Evidence in support of psychometrics of the JSE has also been reported in nursing students,³⁵ students in dental school,³⁶ and in Mexican,³⁷ Japanese,³⁸ and Korean³⁹ medical students. Data in support of the psychometrics of the Italian translation of the JSE have been reported in Italian physicians.⁴⁰ The JSE has received broad acceptance and has been translated into 42 languages to date.

The JSE includes 20 items, each answered on a seven-point Likert-type scale (1 = strongly disagree, 7 = strongly agree). Three versions of the JSE are available: one for administration to physicians and other health professionals (HP-Version, which was used in this study), one for administration to medical students (S-Version), and a third for administration to students in health professions other than medicine (HPS-Version). The three versions are similar in content with slight modifications in wording to maintain their face and content validities for their respective target populations. The underlying constructs of the scale

include perspective-taking, compassionate care, and walking in the patient's shoes, which are the major components of empathy in the context of patient care.^{14,33}

Measures of disease complications

We used as the outcome measure the presence of acute metabolic complications among diabetic patients, including hyperosmolar state, diabetic ketoacidosis, and coma, identified by ICD-9-CM codes for patients who were hospitalized in 2009.⁴¹ Diabetes mellitus is a complex disease entity that can lead to many complications, which can be classified in four categories: acute metabolic, vascular, neurological, and infectious. We chose to focus on the acute metabolic complications in this study for two reasons. First, these complications (e.g., ketoacidosis, coma) require hospitalization, and their occurrence can therefore be extracted from the ICD-9-CM coded hospital discharge abstract data. Chronic vascular and infectious complications of diabetes mellitus are often treated until the later stages in different ambulatory settings, and administrative data do not reveal their presence. Second, metabolic complications can develop rather quickly, and their prevention is more likely to be influenced by the primary care physician, whereas the other complications are often managed by specialists whose specific contributions are difficult to trace.

Statistical analyses

We arbitrarily divided the participating physicians into three groups based on the distribution of their empathy scores. We used analysis of variance to test the significance of the differences on empathy among physicians. We used the *z*-test for proportions to test statistical significance of differences in rates of patients with disease complications at different levels of physician empathy scores. We performed a logistic regression analysis to examine the contribution of physician empathy in predicting metabolic complications among diabetic patients after controlling for selected intervening variables. In this model, we included the following variables to control their confounding effects on the relationships between physician empathy and the outcome measure: physicians' gender, physicians' age (median split,

Table 1

Means and Standard Deviations of Jefferson Scale of Empathy Scores of 242 Generalist Physicians in Parma, Italy, 2010

Physician empathy level*	No. of physicians	Mean score (standard deviation)	Range of scores
High scorers	81	119.4 (5.4)	112–137
Moderate scorers	84	105.1 (4.3)	97–111
Low scorers	77	85.2 (9.6)	49–96
Total	242	103.6 (15.4)	49–137

* $F_{(2,239)} = 503.1, P < .001$ (high scorers > moderate scorers > low scorers). Participating physicians were arbitrarily divided into three groups based on the distribution of their JSE scores.

<56, ≥56), patients' gender, patients' age (median split, <69, ≥69), physicians' type of practice, geographical area of medical practice (hill, mountain, plain), and duration of time patient enrolled with the same primary care physician (<5 years versus ≥5 years). We performed all statistical analyses using SAS Version 9.2 (SAS, Cary, North Carolina).

Results

Grouping of physicians based on their empathy scores

Of the 301 primary care physicians in the local health authority of Parma, 242 completed and returned the JSE (80.4% response rate). A comparison of the age and gender of physicians who participated in the study and those who did not participate showed no statistically significant differences. We classified participating physicians into the three groups of high scorers (top third, *n* = 81), moderate scorers (middle third, *n* = 84), and low scorers (bottom third, *n* = 77). Means, standard

deviations, and ranges of empathy scores among the three groups are presented in Table 1. As shown in Table 1, the differences in mean empathy scores among the three groups of physicians were statistically significant ($F_{(2,239)} = 503.1, P < .001$).

Physicians' level of empathy and disease complications among patients

Of the 284,298 adult patients of the participating physicians in 2009, 20,961 patients (7.4%) were identified as having diabetes mellitus. Sixty-one percent (*n* = 12,786) of the patients with diabetes were 65 years of age or older; 51% (*n* = 10,690) were male. There were 123 patients hospitalized in 2009 with acute metabolic complications of diabetes mellitus (41 hyperosmolar state, 53 diabetic ketoacidosis, 26 coma, and 3 with a combination of these complications). Rates of acute metabolic complications per 1,000 patients in high, moderate, and low empathy scoring physicians are reported in Table 2.

Table 2

Association Between High, Moderate, and Low Jefferson Scale of Empathy Scores of Physician Participants (*n* = 242), 2010, and Disease Complications in Their Diabetic Patients (*n* = 20,961), 2009, Parma, Italy

Patient characteristics	Physician empathy level*		
	High scorers	Moderate scorers	Low scorers
No. with diabetes mellitus	7,224	7,303	6,434
Acute metabolic complications			
No. of patients [†]	29	52	42
Rate (no. per 1,000 patients)	4.0	7.1	6.5

*Comparing high- and moderate-scoring physicians on the rates of occurrence of acute metabolic complications in their patients with diabetes mellitus: $z = 2.51, P < .01$. Comparing high- and low-scoring physicians on the rates of occurrence of acute metabolic complications in patients with diabetes mellitus: $z = 2.04, P < .05$.

[†]One hundred twenty-three patients were hospitalized with acute metabolic complications in 2009: 41 with a hyperosmolar state, 53 with diabetic ketoacidosis, 26 with coma, and 3 with a combination of these complications.

As shown in Table 2, the rate of acute metabolic complications (per 1,000) for patients of physicians in the high, moderate, and low empathy score categories were 4.0, 7.1, and 6.5, respectively. The results of the *z*-test for proportions showed that physicians in the high empathy score group had a lower rate of patients with acute metabolic complications (4.0/1,000) than did those in the moderate (7.1/1,000) ($z = 2.51, P < .01$) and low (6.5/1,000) ($z = 2.04, P < .05$) empathy score groups. We observed no statistically significant difference in the rates of patients' acute metabolic complications between physicians in the moderate and low empathy scoring groups.

Logistic regression analysis

Summary results of the logistic regression analysis are reported in Table 3. These results indicate that physician empathy scores significantly contributed to the prediction of acute metabolic complications in diabetic patients, taking into account the effects of confounding variables in the statistical model. The odds ratio (OR) of 0.59, which we obtained by comparing low and high JSE scorers, indicates that shifting from a low- to a high-scoring category of physician empathy decreased the odds of metabolic complications among diabetic patients by 41%. Also, patients' age contributed significantly to the prediction of metabolic complications. An OR of 1.70 comparing older (age ≥ 69 years) and younger (age < 69) patients indicates that the odds of metabolic complications increased by 70% for older patients. None of the other variables shown in Table 3 contributed significantly to the logistic regression model.

Discussion

Results of this study confirmed our hypothesis that a validated measurement of physician empathy is significantly associated with the incidence of acute metabolic complications in diabetic patients. A number of explanations for our findings are plausible. For example, one can reasonably assume that a physician's empathic engagement in patient care enhances mutual understanding, which leads to a trusting relationship between physician and patient.¹⁴ A trust-based relationship in patient care is a "royal road" to optimal

Table 3

Summary Results of Logistic Regression Analysis Predicting Acute Metabolic Complications in 20,961 Diabetic Patients of 242 Physicians Completing the Jefferson Scale of Empathy (JSE) by Physician-Related and Patient-Related Predictors, Parma, Italy, 2009

Predictors	Odds ratio (95% confidence interval)
Physician's JSE score*	
Low	(reference)
Moderate	1.1 (0.69–1.6)
High	0.59 (0.37–0.95) [†]
Physician's gender	
Female	(reference)
Male	1.1 (0.66–1.7)
Physician's age	
<56 (reference)	(reference)
≥ 56	0.94 (0.64–1.4)
Type of medical practice	
Association	(reference)
Solo	1.0 (0.50–2.0)
Geographical location of medical practice[‡]	
Mountain	(reference)
Hills	1.1 (0.52–2.1)
Plain	1.6 (0.77–2.9)
Patient's gender	
Female	(reference)
Male	0.93 (0.65–1.3)
Patient's age	
<69	(reference)
≥ 69	1.7 (1.2–2.4) [†]
Time patient enrolled with the same primary care physician	
<5 years	(reference)
≥ 5 years	0.67 (0.44–1.0)

*Participating physicians were arbitrarily divided into three groups based on the distribution of their 2010 JSE scores: low = 49–96; moderate = 97–111; high = 112–137.

[†] $P < .01$. Hosmer–Lemeshow goodness-of-fit test: $\chi^2_{(8)} = 8.6, P = .37$, indicating that the logistic model is mathematically sound.

[‡] The Italian National Institute for Statistics divides Italy into areas based on the aggregation of contiguous commune in three altitude zones: The mountain zone is a territory where there are significant areas with an altitude of 700 meters and above. The hill zone is a territory where there are prevalent elevated areas with an altitude less than 700 meters. The plain zone is flat territory without any landmasses over 300m. (Source: ISTAT. Istituto Nazionale di Statistica. 14 Censimento Generale della Popolazione e delle Abitazioni. 2001. Glossario. Zona altimetrica. [In Italian.] <http://dawinci.istat.it/daWinci/jsp/dwGloss.jsp?tav=home>. Accessed May 23, 2012.)

clinical outcomes through mechanisms of better communication and greater compliance with treatment plans.

Although empathic engagement is important in patient care regardless of physicians' specialty, it is more critical in the primary care setting, which requires long-term physician–patient encounters and continuity of care. Studies suggest that patients of primary care physicians, in particular, expect

their doctors to demonstrate skills in empathic communication.⁴² In a large-scale study of primary care physicians in Denmark, patients were more likely to recommend doctors who demonstrated better empathic skills, such as expressing interest to explore more about patients' concerns, facilitating communication, and helping patients with their emotional problems.⁴³ One study in a primary care setting reported that patients with the common cold who

perceived that their physician was empathic had shorter duration of illness and less severe conditions associated with their immune system changes.⁴⁴ Our findings provide additional empirical support for the beneficial effects of empathy in patient care.

Several factors add to the strength of our study. Because of universal health coverage in Italy, there is no confounding effect of differences in insurance coverage, lack of health insurance, or financial barriers to access care. Also, the Italian health care system has specific features that contribute to a lower rate of switching doctors, facilitating long-lasting physician–patient relationships, which has significant advantages for this type of research. In Italy, all residents select and enroll with a primary care physician, whereas in the United States it is often difficult to identify patients' primary care physicians in a non-managed-care population.

The physician response rate of 80.4% achieved in this study, along with the lack of significant differences in age and gender mix between participating and nonparticipating physicians, increase our confidence that participating physicians represented the entire intended population of physicians.

From a variety of diabetes complications, we chose acute metabolic complications as the clinical outcomes measure because patients with these complications require hospitalization, which made it possible for us to access administrative data (ICD-9-CM codes) from hospital discharge data for residents of the Emilia-Romagna region. We chose not to use other complications (e.g., vascular, neurological, infectious) because they are often treated in the ambulatory setting and may require specialist care that can obscure the direct link between primary care physician empathy and patient outcomes.

Determining cutoff scores for high, moderate, and low empathy scores for different groups of physicians in different cultures and different specialties by gender could help us understand how much empathy is sufficient for better patient outcomes, but doing so would be a gigantic task. Cutoff scores would likely vary depending on the patient population and outcome of interest.

However, the limited data in this study showed that the clinical outcomes were better for patients of the sample of Italian primary care physicians who were in the high-scoring group. The JSE scores for these physicians were greater than 111 (Table 1), suggesting that a cutoff score of 111 could be considered a threshold in this setting to differentiate physicians who are more likely than others to have better patient outcomes.

Despite its positive features, this study has some limitations that may jeopardize the generalizability of the findings. One limitation is the correlational design of the study, which does not allow for a cause-and-effect relationship between physician empathy and patient outcomes. Replication of the study in other cultures with different health care systems, using different disease conditions (e.g., hypertension, asthma, infectious diseases, cancer) would add to our confidence about the broader relevance of the findings and the possibility of cause-and-effect relationships.

We were also limited to administrative data in identifying patients with diabetes mellitus and their complications. The U.S. Centers for Disease Control and Prevention estimate that the “diagnosed” prevalence of diabetes mellitus in the United States is approximately 7.3%.⁴⁵ In 2007, the Emilia-Romagna region, using administrative data and similar methods over a shorter time period, estimated the prevalence of diabetes in patients over 35 to be 7.2%.⁴⁶ The administrative data limitation in our study is mitigated to some extent by the fact that the estimated prevalence of diabetes mellitus that we found (7.4%) is consistent with these data.

We also relied on ICD-9-CM coded discharge abstract data to identify complications in hospitalized patients. The Emilia-Romagna region has a system in place to monitor the quality of diagnosis and procedure coding in their hospital discharge abstract data. Controls at both the hospital and regional level assess the validity of coding and the consistency of codes assigned, such as congruity between sex, age, and diagnosis, and between diagnosis and procedure. Although coding errors are possible, it is unlikely that a serious metabolic complication,

such as diabetic ketoacidosis or coma, would not be recognized and coded.

We must also acknowledge the effects of other variables that could contribute to the clinical outcomes but were not controlled for in our study. Patient outcome is a complex concept which involves multiple factors, including physician competence, patient compliance, availability and effectiveness of medical management, social support systems, cultural factors, ethnicity, disease severity, comorbidity, multidisciplinary interventions, environment of care, insurance policies, and health care regulations, among others. Although we controlled for available intervening variables that could possibly confound the findings (e.g., physicians' and patients' gender and age, type of practice, geographical location, duration of time a patient was enrolled with the same primary care physician), there are many other variables that were not available to us, and these should be controlled as much as possible in future research on this topic. The pattern of the findings would perhaps be different if additional intervening variables were taken into consideration. Although this argument has merit, empirical scrutiny is required to examine whether controlling for these intervening variables would substantially change the study outcomes.

Despite the study limitations, findings of this study and a previous study²¹ on the link between physician empathy measured by a validated instrument and patient outcomes support the notion that empathy should be considered an important element in patient care and a significant factor of overall physician competence that must be enhanced during medical education, and applied in the practice of medicine.

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Teaching and Learning Moments

Physicianship Amongst Physicians-in-Training

As medical students, we are taught to consider the patient, not simply the diagnosis. This concept, known as physicianship, encourages us to validate and dignify the lives of our patients while empathically looking for pertinent clues and findings to diagnose their condition. Despite its inherent humanism, we often hesitate to practice physicianship because, in our clinical experiences, carrying on a conversation with a patient does not extend far beyond the science of his or her condition.

During medical school, an encounter with a patient, Mr. O, led me to realize that the distinction between science and physicianship is not always clear and that, in medicine, the two often overlap.

On an otherwise typical Tuesday afternoon in the clinic, I was assigned to see the last patient of the day, Mr. O. As usual, I entered the exam room and said hello. Mr. O was a 78-year-old gentleman who appeared quite healthy upon my initial exam. I spent the next 30 minutes completing my duties as a medical student—taking a history, checking his vital signs. During

this time, I did most of the talking. I learned that, since his last visit, Mr. O had achieved his weight loss goal and had regained full range of motion in his previously injured knee.

Despite the good news, I recognized that Mr. O still was dissatisfied. I doubted that his dissatisfaction was with me or with our recent interaction. Instead, I sensed that he was looking for someone simply to listen to him. Was it possible that not one of his doctors had taken the time recently to listen to what he had to say if what he had to say wasn't the answer to a question on his chart? Because I had extra time before my supervisor would be ready to review Mr. O's case with me, I decided to spend that time with Mr. O in the hopes of remedying his apparent loneliness in addition to his physical ailments. I started with the question "What do you like to do for fun?" Out of nothing, something remarkable evolved.

For the next half hour, Mr. O did all of the talking. Uncontrollably, he spoke, yelled, cried, and laughed, ridding himself of some of the pain that he

had carried for so many years. Slowly, he slid his hand into his pocket and retrieved the list of his prescriptions. He stared intently at the name tag that hung from my white coat and began to write my name on the same piece of paper. He hugged me and politely asked, "Can I add you to my list of medications?"

If I ever doubted the merits of physicianship, Mr. O reinforced them in a way that I will never forget. That day, I thanked God not for my voice or for my name but for having blessed me with the ability to listen. I learned how simple caring for patients could be—just be there to listen to them. As medical students, we may not be licensed to write prescriptions yet, but our white coats are, more often than not, the safest, most powerful medication that our patients need.

Author's Note: The name in this essay has been changed to protect the identity of the patient.

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