A Cross-sectional Measurement of Medical Student Empathy

Daniel Chen, MD¹, Robert Lew, PhD^{2,3}, Warren Hershman, MD, MPH¹,
and Jay Orlander, MD, MPH^{1,4}

¹Section of General Internal Medicine, Evans Department of Medicine, Boston University School of Medicine, Boston, MA, USA; ²Department of Biostatistics, Boston University School of Public Health, Boston, MA, USA; ³MAVERIC, VA Boston Healthcare System, Boston, MA, USA; ⁴Medical Service, VA Boston Healthcare System, Boston, MA, USA.

BACKGROUND: Empathy is important in the physician-patient relationship. Prior studies have suggested that physician empathy may decline with clinical training.

OBJECTIVE: To measure and examine student empathy across medical school years.

DESIGN AND PARTICIPANTS: A cross-sectional study of students at Boston University School of Medicine in 2006. Incoming students plus each class near the end of the academic year were surveyed.

MEASUREMENTS: The Jefferson Scale of Physician Empathy-Student Version (JSPE-S), a validated 20-item self-administered questionnaire with a total score ranging from 20 to 140. JSPE-S scores were controlled for potential confounders such as gender, age, anticipated financial debt upon graduation, and future career interest.

RESULTS: 658 students participated in the study (81.4% of the school population). The first-year medical student class had the highest empathy scores (118.5), whereas the fourth-year class had the lowest empathy scores (106.6). Measured empathy differed between second- and third-year classes (118.2 vs 112.7, $P < .001$), corresponding to the first year of clinical training. Empathy appears to increase from the incoming to the first-year class (115.5 vs 118.5, $P = .02$). Students preferring *people-oriented* specialties had higher empathy scores than students preferring *technology-oriented* specialties (114.6 vs 111.4, $P = .002$). Female students were more likely than male students to choose people-oriented specialties (51.5 vs 26.9%, $P < .001$). Females had higher JSPE-S scores than males (116.5 vs 112.1, $P < .001$). Age and debt did not affect empathy scores.

CONCLUSIONS: Empathy scores of students in the preclinical years were higher than in the clinical years. Efforts are needed to determine whether differences in empathy scores among the classes are cohort effects or represent changes occurring in the course of medical education. Future research is needed to confirm whether clinical training impacts empathy negatively, and, if so, whether interventions can be designed to mitigate this impact.

KEY WORDS: empathy; medical student education; physician attitudes.
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INTRODUCTION

Empathy is the cornerstone of the physician-patient relationship. It is the physician's ability to cognitively recognize a patient's perspectives and experiences, and convey such an understanding back to the patient.^{1,2} This understanding allows the patient to feel respected and validated.^{3,4} Empathy promotes patient and physician satisfaction, contributes to patient enabling and participation, and may improve patient outcomes.^{1,5-10} Furthermore, empathy improves the quality of data obtained from the patient, improves the physician's diagnostic ability, and decreases the rate of miscommunication and lawsuits.^{1,3,4,11}

There is concern among educators that clinical training may have an adverse effect on medical resident and student empathy. In one cohort of internal medical residents, empathy was measured to be highest at the beginning but decreasing by the end of internship, and remained low through to the end of residency.^{12,13} The work-related challenges, including long work hours and sleep deprivation, are reasons believed to contribute to this decline.¹⁴ Studies among students have shown that empathy measured over the third year of one cohort of medical students declined,¹⁵ and that a single medical school class had higher measured empathy at the start compared to the end of medical school.¹⁶

This study investigates empathy more closely across the entirety of medical school education while controlling for the potential confounding effects of gender, age, anticipated financial debt upon graduation, and future career interests.

METHODS

This is a cross-sectional study of all medical students enrolled at Boston University School of Medicine (BUSM) during 2006. This study was approved by the Boston University Medical Center Institutional Review Board.

STUDY PARTICIPANTS

All incoming medical students and those completing first-through fourth-year medical school in 2006 were eligible to participate in the study.

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The BUSM curriculum is a traditional 4-year medical school with 2 years of preclinical study, with limited patient contact, followed by 2 years of clinical clerkships and electives.

STUDY DESIGN

One author (DC) distributed the self-administered, anonymous surveys to the medical students between March and September 2006. Incoming medical students were surveyed during Orientation Week, before the beginning of first-year medical school classes. First- through fourth-year medical students were surveyed during classes or class events, where attendance was recommended but not mandatory, at the end of their academic year. In total, 5 medical school classes were studied.

The primary measure of empathy, the *Jefferson Scale of Physician Empathy—Student Version* (JSPE-S), is a 20-item psychometrically validated instrument measuring components of empathy among health professionals in patient care situations.^{2,17,18} Respondents indicate their level of agreement to each item on a 7-point Likert scale. The JSPE-S total score ranges from 20 to 140, with higher values indicating a higher degree of empathy.^{2,17,18} In past studies, total scores among medical students ranged from 115 to 123.1 and standard deviations ranged from 9.9 to 14.1.^{2,15,19,20}

Students also specified gender, age, anticipated financial debt, and likelihood of choosing various specialties. Gender was included because practicing female physicians and medical students have been found to have higher empathy than their male counterparts.^{2,19} As empathy involves aspects of perception and concern, which may be gained with more maturity, we included age as a confounder.²¹ The anticipated level of financial indebtedness at graduation was assessed to the nearest \$25,000. Financial indebtedness may potentially influence the selection of career choice and cause high debt students to prefer more lucrative (often technical) specialties.

Students indicated their career specialty intentions, in terms of likelihood of entering each of the specialties listed in Table 1, on a 4-point Likert scale (very unlikely = 1, ... very likely = 4). The *people-oriented* and *technology-oriented* specialty categorizations were based on categories determined in prior studies.^{2,17} Each student was assigned to one of these two categories after comparing his or her average Likert score for each group of specialties. For example, if the average score for all people-oriented specialties was 2.0 and the average score for technology-oriented specialties was 2.8, the student was

considered preferring technology-oriented specialties. Students with no difference in their scores were not included in analyses of specialty preference. We believed that students with higher measured empathy might associate with the people-oriented careers. As such, student career preferences could potentially confound our results and, thus, needed to be controlled. This construct does not imply that career preference calibrates empathy but instead that students who feel that empathy enhances their skills would gravitate toward higher levels of patient contact.

A nonresponder was defined as a student who failed to return an administered survey. An adequate response to the survey was defined as having 16 or more of the 20 JSPE-S questions answered. Surveys with fewer than 16 JSPE-S questions answered were discarded. In cases where surveys were incomplete but had more than 16 JSPE-S responses, we prorated the total scores to give a score with a denominator of 140.

Missing values were rare for most demographic factors and were simply imputed: age (overall mean) and debt category (mode). Missing values could not be imputed in a simple way for gender as imputation of gender affected the analysis. Thus, several approaches were taken. First, data were stratified into three groups, *male*, *female*, and *gender unspecified*. Second, using cases where gender was known as the end point, we constructed a discriminate function from the 20 JSPE-S questions to discriminate male from female. Next, we applied this rule to the gender unspecified subgroup and imputed their gender.

Descriptive statistics and analyses of variance (ANOVAs) were run to compare the different JSPE-S scores among the different classes and categorized groups, whereas controlling for the effects of gender, age, anticipated financial indebtedness, and career preference. Post hoc ANOVA pairwise comparisons were made using Tukey's HSD test. All computations were done with SAS statistical software version 9.

RESULTS

Of the 723 surveys distributed, 658 surveys were returned for an overall response rate of 91.0%. These 658 respondents represent 81.4% of the total students at BUSM in 2006. No differences are seen in the demographic features (age and gender) between responders and nonresponders in the medical school (data not shown). Third-year students have the lowest response rate and the fourth year students have the lowest percentage surveyed (see Table 2).

Table 2 shows the number of students by class among the 658 responding medical students. The number of surveys used in the analysis was 648 because 10 surveys had fewer than 16 out of 20 responses.

The primary multivariate ANOVA considers 4 factors: class, gender, anticipated financial debt, and career preference as well as age. The initial ANOVA model contains all interactions, but highly nonsignificant interaction terms are discarded (data not shown). Hence, the ANOVA factors of interest are class ($P < .001$), gender ($P < .001$), age ($P = .04$), debt ($P = .71$), career preference ($P = .003$), and the gender-class interaction term ($P = .11$).

The 15 subjects with unspecified gender have the lowest mean total scores, indicating that the gender values are not missing at random. A discriminant function based on the 20-item JSPE-S, applied to the gender unspecified surveys, classifies all the unspecified surveys as males. While ex-

Table 1. Career Preference Categories^{17,18}

People-oriented specialties	Technology-oriented specialties
Internal medicine	Pathology
Family medicine	Surgery and surgical subspecialties
Pediatrics	Radiology
Neurology	Radiation oncology
Rehabilitation medicine	Anesthesiology
Psychiatry	
Emergency medicine	
Obstetrics and gynecology	
Ophthalmology	
Dermatology	

Table 2. Demographics and Characteristics of the Medical School Classes

	Incoming	First-year	Second-year	Third-year	Fourth-year	Totals all classes
Number of students	179	160	148	167	154	808
Number of surveys distributed	179	146	147	149	102	723
Number of responders (response rate %)	172 (96.1%)	138 (94.5%)	142 (96.6%)	115 (77.2%)	91 (89.2%)	658 (91.0%)
Percentage of class surveyed (%)	96.1%	86.3%	96.0%	68.9%	59.1%	81.4%

treme, the resultant proportions become more concordant with the proportions of male and female in the medical school (data not shown).

Table 3 shows the JSPE-S scores by class. The first-year medical school class has the highest empathy scores (118.5), whereas the fourth-year class has the lowest empathy scores (106.6). No difference is seen between first- and second-year classes (118.5 vs 118.2, $P=.77$), or between third- and fourth-year classes (112.7 vs 106.6, $P=.10$). There is a difference between second- and third-year classes (118.2 vs 112.7, $P<.001$), which corresponds to the first clinical year in medical school. There is also a difference in JSPE-S scores between incoming and first-year classes (115.5 vs 118.5, $P=.02$), and between incoming and second-year classes (115.5 vs 118.2, $P=.04$). The incoming class has suggestive differences in empathy scores when compared to the third-year class (115.5 vs 112.7, $P=.05$), and the incoming class differs from the fourth-year class (115.5 vs 106.6, $P=.02$).

When looking at the differences in JSPE-S scores by gender, female medical students have higher empathy than male medical students (116.5 vs 112.1, $P<.001$). Students preferring people-oriented specialties as a career have higher empathy than students preferring technology-oriented specialties (114.6 vs 111.4, $P=.002$). Age, while significant, has a small effect on empathy scores (scores rise 0.6 with age), but has no effect on other associations. Female students prefer people-oriented specialties more than men (61.9 vs 36.1%, $P<.001$).

In our analysis, no association is noted between career preference and anticipated financial debt among women ($P=.33$) or men ($P=.96$). There is no relationship seen between gender and anticipated financial indebtedness ($P=.29$) or between different medical school classes and anticipated financial indebtedness ($P=.59$). In addition, we find that 72.1% of medical students anticipate having more than \$200,000 debt after graduation, whereas 14.8% of students anticipate having less than \$25,000 debt.

Table 3. JSPE-S Scores by Medical School Class

Class	JSPE-S score	Standard error
Incoming	115.5 ^A	1.8
First-year	118.5 ^B	1.8
Second-year	118.2 ^B	1.8
Third-year	112.7 ^{A,C}	1.9
Fourth-year	106.6 ^C	2.3

The class was adjusted for gender, age, anticipated financial indebtedness, career preference, and gender-class interaction.

Groups that share the same superscript are not significantly different from one another. All other differences in JSPE-S scores are significant at the $P<.05$ level.

DISCUSSION

In our cross-sectional study, empathy appears to increase during the first year of medical school, but falls after the third year (first clinical year) and remains down through the final year of medical school. JSPE-S scores differ by as great as 11.9 points between the first- and fourth-year classes after adjusting for gender, age, financial indebtedness, and career preferences.

Our results, although cross-sectional, are consistent with previous studies, suggesting that empathy decreases after clinical training in medical school. Using the JSPE-S, one cohort of medical students had a decline in empathy during the third year of medical school.¹⁵ This group of 125 third-year medical students exhibited a postclerkship decline in empathy of 2.5 points (123.1 to 120.6). The authors found no significant associations between changes in empathy scores and gender, age, or academic performance on step 1 of the USMLE.¹⁵ Another group measured empathy in a cohort of medical students at the beginning of medical school and just before graduation and found lower empathy scores in the graduating class.¹⁶ Among another group of health care professionals, dental students, empathy scores also decreased after patient care responsibilities began.²⁰ The only other cross-sectional study of multiple medical school classes that we could find did not demonstrate differences in empathy across classes, but this study used an outcome measure, which was not specifically designed for health professionals.²²

Studies of medical resident empathy have noted similar declines. A cross-sectional study in an internal medicine program observed that first-year residents scored 4 points higher on the JSPE-Physician Version than third-year residents (117.5 vs 113.5, $P=.31$).¹¹

Whereas these studies lack an assessment of behavior, one recent report showed a positive association between the individuals' scores on the JSPE-S in medical school and ratings of their empathic behavior made by their residency program director 3 years later.²³ This study suggests a long-term predictive validity of the self-report empathy scale.

Various stressful aspects of medical education and training, such as long work-hours and sleep deprivation, as well as dependence on technology for diagnoses, shorter patient hospitalizations, and limited bedside interactions may contribute to decreases in empathy.^{14,24-27} In response, some programs now include clinical narrative or critical incident writing; classes on medically themed creative writing, literature and art; journal writing; and use of standardized patients in the medical education curriculum to maintain or increase empathy.²⁸⁻³⁴ Studies offer conflicting results with respect to their impact on empathy. One group preliminarily measured an increase in empathy in students who participated in role-playing and simulated patient scenarios.³⁵ In contrast, an entire

medical school class taking a 4-month patient-interviewing course designed to teach communication and emphasize empathy did not show an improvement in the latter.¹⁶ A recent review suggests that empathy may be amenable to a range of interventional strategies.³⁶ Qualitative data from independent observations and unvalidated surveys note that these interventions improve student communication skills and empathy. Lastly, student course evaluations and feedback suggest that students respond positively to these educational interventions and perceive themselves to be more sensitive and empathic toward their patients from such activities despite a lack of more objective outcomes.^{26,28,31–34,36,37}

Another possible explanation for the observed decrease in empathy may be an acculturation phenomenon. Student doctors experience a wide range of emotions and stresses and may struggle to maintain their empathy.^{14,38} This would suggest that to remain effective for patients, students and trainees become less empathic as they face emotionally challenging and draining situations. Outcome measures to assess such a hypothesis should be included in future research.

We found that medical students expressing a preference for people-oriented specialties had higher empathy scores than those expressing a preference for technology-oriented specialties. These data are consistent with another study, which found that students likely choosing family medicine, internal medicine, psychiatry, pediatrics, and obstetrics and gynecology had higher empathy scores than all other specialties, when controlled for gender effects.²²

Previous studies have demonstrated a difference in empathy among practicing physicians of different specialties. Physicians in people-oriented specialties, such as primary care specialties (family medicine, internal medicine, and pediatrics), obstetrics and gynecology, emergency medicine, psychiatry, and medical subspecialties, had higher average empathy scores than physicians in technology-oriented specialties—aneesthesiology, radiology, pathology, surgery, and surgical subspecialties (see Table 1).^{2,17} Psychiatrists had the highest mean JSPE–Physician Version score (127.0), primary care specialists scored from 120–122, and the lowest values were noted in orthopedic surgeons and anesthesiologists (approx. 116).¹⁸

Students may possibly be prestratified in career preferences before coming to medical school, with those students who are naturally endowed with more empathy attracted to people-oriented specialties. Although we categorized medical students as preferring either people-oriented or technology-oriented specialties, the vast majority of incoming and first- through third-year medical students had small mean differences ranging from 0.46 to 0.62 when comparing their average Likert score for the people-oriented and technology-oriented specialty groups. This suggests that they may not be definitive in their career preference early in medical school and raises the possibility of changing career preferences with different experiences in medical school. Future studies should determine whether fostering empathy skills impacts student career preferences. With fewer graduating medical students selecting careers in primary care (people oriented) specialties,^{39–41} if enhancement in empathy can be achieved and be shown to modify career preference, potential policy implications regarding medical curricula and resource allocation could be possibly driven by societal or regional needs for primary care clinicians.

There are several limitations of our study. First, our measurement of empathy, the JSPE-S, is self-reported. It measures medical students' orientation to empathy and is not correlated with behavior. A recently demonstrated correlation between individuals' empathy scores at the beginning of third year of medical school and ratings of their empathic behavior at the end of their first year of postgraduate training does suggest predictive validity of the JSPE-S.²³ Studies of practicing physicians have noted that JSPE score difference is as great as 11 between practicing psychiatrists and anesthesiologists,¹⁸ a range difference seen in some of our comparisons.

A second limitation of our study is the possibility of cohort effects. We recognize this as a limitation of all cross-sectional studies. However, except for our new finding of differences seen in the preclinical years, our data are consistent with other studies of medical student empathy, which suggest a decline during medical school.^{15,16} Unexpectedly, we found that there is an increase in empathy scores from beginning to end of first-year among the medical students. As the JSPE-S questions were designed to assess the empathy of health care providers in patient-provider situations, it is possible that a complete lack of clinical exposure impacts how the JSPE-S is completed by incoming students and hence the instrument may be invalid in this group. Whereas there is limited patient contact in the first 2 years of our medical school, students do interact with patients when shadowing practicing physicians and participating in their clinical skills training courses. Patient contact in the context of the first 2 years of medical school possibly alters the perception of students so that the subjective anchors on JSPE-S questions and Likert-scale anchors are interpreted differently. Alternatively, the limited clinical exposure during the first 2 years of medical school may positively influence medical students' empathy by reinforcing their desire to help people through medicine. A third hypothesis is that this represents a cohort effect. The robustness of our observation could be tested by sequentially tracking these medical student cohorts.

Lastly, we acknowledge that attendance, survey participation, and possibly response (e.g., level of empathy) may be influenced by the situations or events during which we obtained the data.

Although our study is limited to one medical school, we feel that our results can be generalized to medical schools that have a traditional structure similar to ours. In particular, we are struck by the consistency of the decline in score after a full year of clinical exposure.

CONCLUSION

Empathy is important in the physician–patient relationship and has clear benefits for the patient and the physician. We found that there are differences in the empathy among the different classes and that empathy declines with increased clinical training in medical school. Whether the decline is reflective of the prevalent teaching methods and modifiable with better methods or is an unavoidable psychological effect of the acculturation process into the medical profession is not yet known.

The association of measured empathy and career preference among medical students is interesting. Although medical students indicate a career preference, the vast majority of

them are not strongly committed in their choice in the first 3 years of medical school. This association suggests the possibility that career preferences can possibly be changed with changes in empathy. Current available data on the impact of interventions does not provide conclusive evidence that empathic behavior can be effectively and permanently improved. Future interventions should examine relationships between empathy, career preferences, and links with clinician behavior, as such finding would have the largest impact on educational policy and practice.

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Corresponding Author: Daniel Chen, MD; Section of General Internal Medicine, Evans Department of Medicine, Boston University School of Medicine, 91 East Concord Street, MAT 2, Boston, MA 02118, USA (e-mail: daniel.chen@bmc.org).

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